THE IRON AGE

New York, January 18, 1923

ESTABLISHED 1855

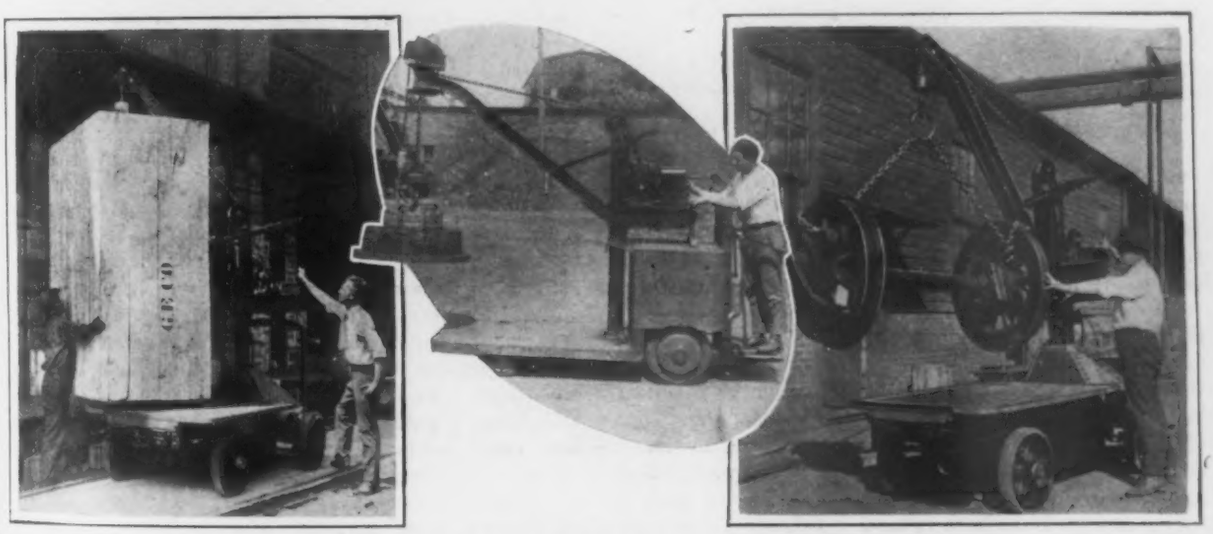
VOL. 111, No. 3

Evolution in Shop Material Handling

An Illustration from the Yale & Towne Plant at Stamford—Regular Traveling Schedules an Important Item in Securing Satisfaction

BY L. S. LOVE

INDUSTRIAL trucks of various kinds and methods of drive have been showing their value more and more clearly in recent years in one shop after another. A notable example is the experience in the plant of Yale & Towne Mfg. Co., Stamford, Conn. The trucking system is supplemented by a comprehensive overhead trolley or monorail system, and its efficiency has been made possible by the maintenance of a regular schedule of operations.

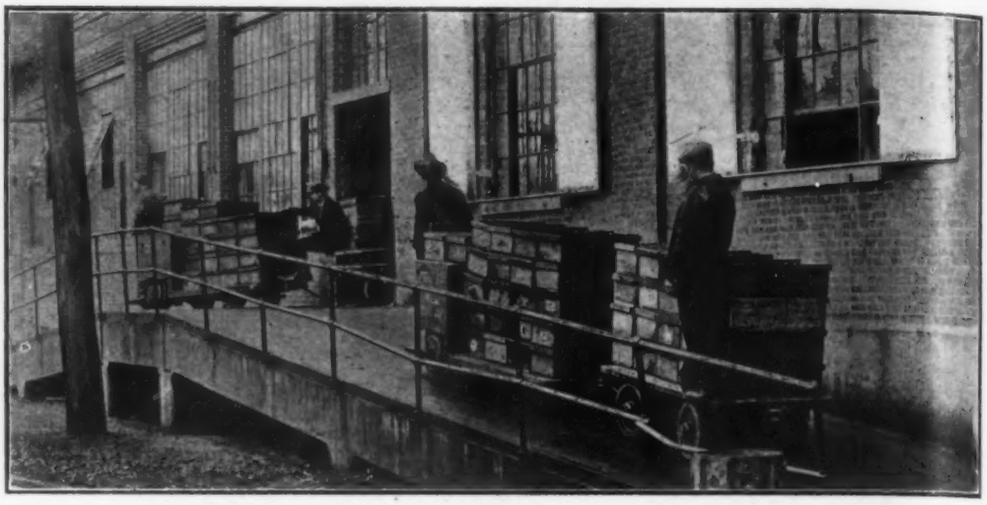


Cranes Mounted on the Trucks and Operated by the Storage Batteries Are Used for Miscellaneous Jobs Requiring the Lifting of Heavy Objects

Previous to 1916 hand trucks were used, requiring the employment of 76 men. In the latter part of 1916, the trucking system was revised; electric trolley and steam locomotive traction was used and one electric industrial truck was added. At this time also the schedule system was put into effect.

The product is handled in two sizes of standardized shop boxes, weighing 5 and 14 lb. each. The average gross weight handled in these boxes is roughly 150 lb. Under the trolley system, all goods were hauled by inter-room truckers, so-called, to certain specified points, which were termed trolley freight stations. The trolley truck working on a regular schedule required about one hour to make a round trip. Eight men were included as the trolley crew. These men did no inter-department trucking whatever, but only loaded and unloaded the trolley truck. The material would be handled to and from the trolley stations by separate trucking forces. The transportation of material in this manner required that each box be handled six times: first, upon the truck in the room; second, off hand truck at trolley station; third and fourth, on and off the trolley; fifth and sixth on and off hand truck from trolley station to destination. This system, however, reduced the trucking force from 76 men to 48 men.

In 1920 a number of changes were made, which would tend to change conditions in trucking requirements. The shop went on a 9-hr. schedule instead of 10 hr. per day. Two new 6 story buildings were erected, increasing capacity and the amount of material to be handled; a salvage department was organized; and the rolling room and annealing room were separated. Two more electric industrial trucks were added, making three in all, with crews totaling 6 men; the trolley was still in use, with a crew of 4 men; and 38 men were in use on inter-room trucking; a total of 48 men, or the same number as in 1916 handling much more work.



Trucks With or Without Trailers Are Operated on Strict Schedule, Delivering Empty Shop Boxes or Handling Boxes Full of the Company's Product.

At the time these data were compiled, the latter part of 1922, the company had in use 10 electric trucks of different types and had eliminated entirely the use of the electric trolley. Only 19 men were employed on inter-room trucking, a saving of 50 per cent on that item. The total saving effected has amounted to between $60,000 and $70,000. The types of trucks now in use on various classes of work include dump body trucks, crane trucks, insulated steel platform trucks for handling hot work, and 3-wheel trucks for small passageways and doorways. The program for additions during 1923 includes several 3-wheel tractors and 4 wheel-steering tier-lift trucks, the company anticipating that these types will prove as profitable as have the others in use in their plant.

Use of Trailers Saves Department Truck Handling

One of the means employed in connection with the electric trucks which has materially cut down on the number of hand truckers is the extensive use of trailers. These are loaded in the various rooms in recesses off the aisles and left standing there for the electric truck to come along on schedule time and haul away. It is possible to use these trailers, even in narrow passages, as they are of the tracking type, following in the track of the traction truck.

This use of trailers has even been extended to the transportation of very delicate cores. These formerly had to be handled on and off elevators by hand and then distributed to the iron and brass foundries by hand, as the transportation on hand trucks was accompanied by excessive and costly breakage. A trailer with a spring mounted platform is used in this service and the breakage is little more than with the hand distribution.

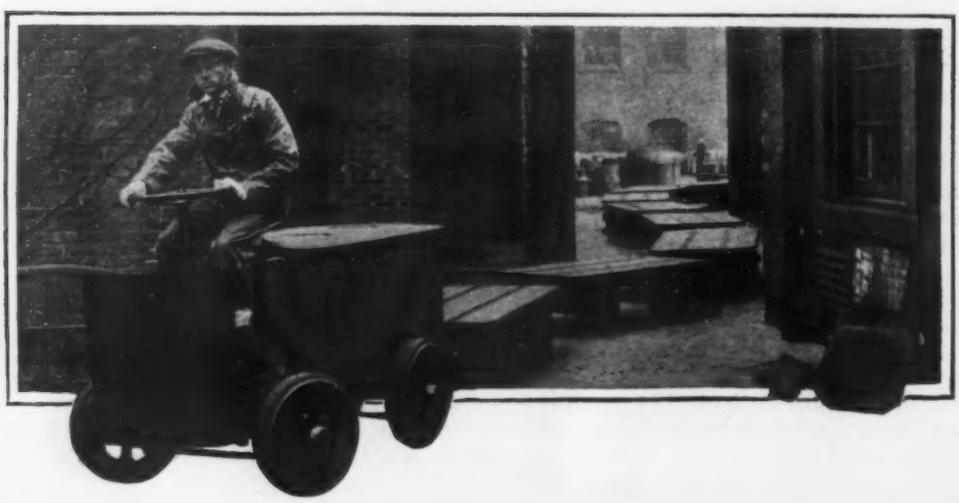
The trailer system in conjunction with electric trucks now handles practically every class of inter-department trucking, including castings being delivered to snagging room and to manufacturing departments, chains, press shop and screw machine scrap; door checks and other finished stock into the stock room and out to the shipping department. Their use has permitted a centralization of all finished stock into one department.

In every department savings are shown in the elimination of labor formerly found necessary, even to the plant upkeep department. In this department trucks are used for transportation of lumber and other materials; in assisting on repairs to the steam locomotive used for shifting freight cars. The crane type of truck is used at times with an electric lifting magnet, on generally miscellaneous work.

Large Tonnage Carried Daily

To make possible the expeditious handling of materials with electric trucks, the company is completing a total of 17,640 sq. ft. of brick or cement runways through the yards. Eighty pairs of swinging doors have been removed, partitions having been put up, where necessary, between aisles and working floors, to protect men from cold. An idea of the tonnage handled is given by the maximum daily amount being 135 tons per truck, with an average for the truck of 61 tons. One truck devoting part time to the distribution of shop boxes handles 611 such daily. Another truck distributing packing cases handles 620 per day.

As an example of savings, a percentage of 66 has been shown in the unloading of sand with a dump body truck. The sand is delivered in barges of about 600



Four-Wheel-Steering Trailers Permit the Use of Industrial Trucks Through Narrow Doors and Passageways

tons. It is loaded into freight cars and shunted to a siding alongside the foundry. Here 5 men load from the car to the dump body truck. This is hauled to a sand pit, up a 12-deg. grade and dumped; 4 men distribute or pile the sand away from the runway and also set the runway, which is portable, in new positions as the sand pile grows. The average number of trips per hour is 15 with 1 cu. yd. each.

The total number of men including one operator for the truck is 10; the time required was 4 days. Formerly this same amount of sand with hand trucking methods required 18 men and 6 days. The saving figures 8 men and an average of 2 days demurrage charges.

In addition to this work, the same truck is used to carry sand to the blasting machine, to the cut-off room and to facing room. It also handles scrap from all points and coal and sawdust and it takes turnings from the salvage department to freight cars. It helps on special work for carpenters, millwrights and tinners, and with use of trailers delivers goods. At times, where this truck is engaged for a lengthy period on loading scrap or unloading sand, another is used to assist on its regularly scheduled work. Its average monthly loading of scrap is 65,000 lb. It handles 414 boxes per day with a weight of 51,750 lb. for that number.

The Overhead Trolley or Monorail System Helps Materially in Maintaining the Trucking Schedule

Dump Body Truck Saves 66% of Former Cost in Delivering 600 Tons Sand to Foundry Sand Pit

A Spring Mounting for the Platform Permits the Company to Transport Cores from Core Bench to Core Ovens and to Molders

Electric Truck Pulls Cupola Fire

Another truck, which eliminated six men, handles work in and out of the snagging room, distributes trailers, boxes and steel trays around the foundry preparatory to pouring and collecting product. After the pour, this truck also pulls the fire, which formerly took 20 men in a tug-of-war game on a rope. The monthly average for this truck is 24,433 boxes, daily 977, with a daily weight of 122,125 lb. It pulls trailers whenever they are ready.

Another truck which handles miscellaneous inter-room and inter-department work saves four men previously required on the hand trucking system.

It was formerly the practice for the

various rooms in shop No. 2 to send a man with a hand truck looking for shop boxes when they were needed. Now one truck with one operator supplies all the various rooms, handling a daily average of 611 boxes or 15,291 per month, with an average saving of three men's time. This truck also pulls trailers whenever they are ready.

There are other instances on a par with those given above, where trucks save the use of several men as compared with former methods. The savings are possible only because the entire system operates on a strict schedule. Each truck is due in a certain department at a definite time to perform its definite tasks there; it then proceeds to the next department on its schedule. In this manner, the head of the trucking department is able to keep track of the trucks and check the activities of each operator, so that soldiering on their part is avoided; also each shop knows just when to expect the truck, which delivers boxes empty or full and hauls away the work finished in that department. A truck operator must account for any delays, if he fails to arrive when due. He is easily checked back through the head of the department where he may claim the delay occurred. All in all the evolution from trolley and hand truckers to electric shop trucks and trailers has proved a very profitable one to the Yale & Towne Mfg. Co.

Carnegie Safety Trophy for 1922 Won by Edgar Thomson Works

Edgar Thomson Works, Carnegie Steel Co., Braddock, Pa., has been awarded the bronze safety trophy for the best record among the plants of the company in the matter of accident prevention in 1922. Officials of the Edgar Thomson works regard the award with considerable pride for the reason that it was won under competitive conditions that were considered to be more favorable to the other competing units. When the prize was first offered in 1920, it was awarded monthly to the plant having the fewest lost time accidents and the plant winning most often in a year secured permanent possession of the trophy, which is a figure symbolizing safety, 27 in. high. Rules for the 1922 race provided for an award on a basis of the reduction in the number of accidents from the average of the individual plants over a period of five years. Edgar Thomson works in 1922 registered a reduction of 85.53 per cent from its five-year average, which is considered remarkable in view of the fact that this plant entered the competition with the best safety record of any of the plants of the company. Duquesne Works ran second with a reduction of 83.10 per cent from its five-year average of lost time accidents.

The 1922 trophy was held each month for a period of a month by that plant making the best monthly record. In January it was won by the Duquesne plant; in February by the City Furnaces; in March by the Clairton Steel Works; in April by the New Castle, Pa., plant; in May, June and July by Edgar Thomson Works, which plant had not one lost time accident in those three months; in August by the Farrell, Pa., plant; in September by the Mingo Junction, Ohio, plant; October and December Edgar Thomson again won it and for November, the Duquesne plant again.

A National Museum of Engineering and Industry

A definite step has been taken toward establishing a national museum of engineering and industry. A joint committee has been appointed by the four founder engineering societies of the United Engineering Society, 29 West Thirty-ninth Street, New York. It is composed of Edward D. Adams and Charles L. Clarke of the American Institute of Electrical Engineers, Frederic A. Delano and Dr. George F. Kunz of the American Institute of Mining and Metallurgical Engineers, Clemens Herschel and Nelson P. Lewis of the American Society of Civil Engineers and Reginald Pelham Bolton and Holbrook Fitz John Porter of the American Society of Mechanical Engineers, the latter acting as chairman.

This committee, in cooperation with the National Museum of the Smithsonian Institution at Washington, is formulating a plan for a national museum of engineering and industry similar in character to foreign museums, especially the Science Museum at South Kensington, London, the Conservatoire des Arts et Metiers at Paris, and Deutsches Museum at Munich, but more comprehensive in scope than those as will befit this country, which has a greater area than the foreign countries, and besides, has become the leading engineering and industrial nation of the world. The plan contemplates a central institution with local branches in different sections of the country with exchange facilities, which may be museums already existing or others to be established according to requirements. The cooperation has been secured of the Federated American Engineering Societies embracing the principal local engineering societies and clubs, and leading industries are joining the movement.

World's Largest Testing Machine Now at Bureau of Standards

The largest testing machine in the world, which has been in use for several years at the branch laboratory in Pittsburgh, has recently been moved to the main laboratory of the Bureau of Standards, in Chevy Chase, a suburb of Washington.

The machine has been erected to continue work on the specimens for the towers of the Delaware River Bridge now under construction at Philadelphia. After that it will be used on the remainder of 72 steel columns which were being tested at Pittsburgh. It has recently been used for tests on 45 samples of brick walls laid in different ways and with different kinds of mortar.

This machine has two massive heads, one set in a concrete foundation beneath the laboratory floor, the other supported on four steel screws, each over a foot in diameter, and two stories high. The upper head may be set at any height by turning the nuts on the screws by means of an electric motor.

The specimen to be tested is placed in the machine by an electric crane capable of lifting 20 tons. The upper head is brought down until it rests on the specimen and the load applied by a huge hydraulic jack built into the lower head. The piston of this jack, on which the specimen rests, is lifted by oil forced into the cylinder under a pressure of 5000 lb. per sq. in. by a motor-driven pump.

It is believed that by careful experimental work a method of design can be found which will allow the strength of steel columns for bridges and buildings to be calculated before they are built. This will be of great benefit to everyone using buildings, as it will be possible to make them safer and at the same time cheaper.

Locomotive Output for December and for 1922

The shipments of locomotives in December, as compiled by the Department of Commerce from reports to the Bureau of the Census from the principal manufacturers, were the largest since January, 1921, and amounted to 210 locomotives. Unfilled orders on Dec. 31 amounted to 1592 locomotives, a slight decline from the previous month. Total shipments of locomotives for the year 1922 were smaller than for 1921 on account of the decline in foreign shipments.

Coal Commission Bent on Finding Remedy

Why the Miner Calls for a High Wage Rate—Repetition of Coal Crisis Intolerable—What "Car Shortage" Actually Means—Averting an April 1 Strike

WASHINGTON, Jan. 16.—Declaring that its inquiry involves the whole question of what is best for the people—whether free competition, government or private ownership, regulation or control in the coal industry—the United States Coal Commission submitted its preliminary report on the bituminous situation to the President and Congress yesterday. The commission now will begin open hearings and enter upon an extended investigation involving all of the complicated elements entering into the coal situation. The preliminary report indicates that sweeping changes in the bituminous industry may be necessary in order to bring about an adjustment that would serve the public, the industries, the employees and the operators. This is indicated in the following significant suggestion:

"Should the operators in given areas be permitted to combine so that the low-cost mines would furnish the product to the people and the high-cost mines be kept in abeyance to meet an emergency, properly regulated as to price and profit by some governmental agency, or should this prime necessity of life and business be left wholly to open competition in the market? This problem is of so great moment, with reference not only to theories of government but also to the economic life of the Republic, that the view of the commission must be left to its final report."

Must Be Steadier Employment

It is declared that there can be no satisfactory agreement as to wage rates and no lasting peace between operators and men unless steadier employment can be provided. The commission further says "There can be no satisfactory solution of our transportation problem as long as the railroads are subjected to sudden peak loads of coal traffic at the season when the demands of agriculture and industry are at their height.

"The commission believes that the public interest in coal raises fundamental questions of the relation of this industry to the nation and of the degree to which private right must yield to public welfare. It may be that both private property in an exhaustible resource and labor in a public service industry must submit to certain modifications of their private rights, receiving in return certain guarantees and privileges not accorded to purely private business or persons in private employ."

Views Will Come Later

The report is signed by all of the qualified members of the commission—John Hays Hammond, chairman; Thomas R. Marshall, Clark Howell, George Otis Smith, Edward T. Devine and Charles P. Neill. Samuel Alschuler, who has not been qualified as a member because he could not lawfully serve in that capacity, owing to the fact that he is a Federal judge, has been present at the hearings which so far have been executive, and approves of the report. No final opinions are expressed at this stage of the inquiry, the commission explaining:

> There is so much controversy over many of the questions—especially those touching on strikes and lock-outs, miners' wages, earnings of companies and upon what theory these earnings are computed, the living conditions of the miners, the competition between the different fields, whether there should be cars sufficient to supply the needs of the whole country at a peak demand, whether the miner is idle because he has no work or because he does not want to work—that the commission deems it to the best interest of the Congress of the United States not to express *prima facie* views upon these subjects, but only to give the facts and express opinions after complete investigations and deliberate thought.

The report points out that the coal industry includes three interrelated industries, mining, transportation and marketing, and that in point of members employed outranks any single manufacturing industry and stands next to transportation and agriculture. Approximately three-fourths of a million men are employed in this industry, of whom 90 per cent work underground. The capital investment is estimated roughly at $2,330,000,000, of which $430,000,000 is invested in the anthracite regions and the remainder in the bituminous fields. The present report is limited to the bituminous coal industry.

Costs and Profits Vary Widely

"Each coal district, if not each mine, has its own local customs and problems, determined by the quality of coal, thickness of seam, attitude of the bed, conditions of mining, the markets which it can reach, its freight rates, its labor policy and other factors. In the matter of wage scales, even in the union districts where wage scales are determined by joint agreement, we find variations from district to district and from mine to mine. Still more difficult to summarize are the wage rates in non-union mines. Not only are these wage rates complicated, but the opportunity to labor varies so greatly from field to field or mine to mine, depending on character of coal, nearness to the market, and commercial connections, that it is hazardous to make any generalization concerning miners' earnings.

"No less difficult under such conditions is the determination of average cost or profit. These subjects require specific and very detailed, painstaking investigation, which is complicated by the varying prices charged and received for the coal, quantity and quality both entering into the subject. The bituminous output is consumed approximately in the following percentages: Railroads, 28; industrials, 25; coking, 15; domestic, 10; iron and steel, 7; public utilities, 7; export, 4; mines, 2; bunkers, 2."

The record of production and distribution of coal in recent years is summed up in the word "instability," and this is declared to have been an important cause in unsettling business and in delaying the return to normal times. Taking up the specific questions involved in the inquiry, the report first makes brief reference to so-called large profits and declares that there has been profiteering in the sense that grossly exorbitant profits have been taken at many times by operators, brokers and retailers. But the commission says it has not yet obtained the figures for the past ten-year period, specifically required by the act in order to settle this question. Dealing with the labor difficulties, the report mentions the frequency of strikes, the resulting coal shortages and high prices, and observes that whatever the merits of the labor controversy it is clear that a continued repetition of these crises in the production and distribution of coal would be intolerable.

Hopeful of Avoiding a Strike

The commission goes on record hopefully and predicts that there will not be a strike on April 1 in view of negotiations now on between operators and miners. It points out that it is seeking to promote industrial peace by ascertaining and publishing certain facts, including wage rates and earnings, volume of employment, costs and profits of the industry, competition of other fuels and of coal produced by non-union mines. These facts are to be the subject of supplementary reports. Returns on costs have been received and are being analyzed from about 2000 operators representing 40 per cent of the total bituminous output. A second group of facts to be dealt with relates to the effect upon the industry of the provisions for the check-off of union dues, participation in management or limitation upon

freedom of management and other working conditions. The commission will investigate and report upon the methods used by union miners to organize these fields and the methods used by the operators to prevent such organization.

What "Car Shortage" Means

Taking up the question of car shortage, the report observes in part:

The so-called "car shortage" is not always due to insufficient coal-carrying equipment alone. In part it has been due to an overload upon the transportation system beyond what that system could reasonably or properly be expected to bear. The period of coal shortage and high prices from the middle of 1916 to March, 1918, was marked by almost continuous complaint of lack of cars at the mines. But the volume of traffic thrown upon the roads as a result of the war exceeded anything in their previous history, and when by the summer of 1918 adequate preparation had been made to handle the traffic all current requirements for coal were met and an unprecedented surplus accumulated in storage. . . .

At the beginning of 1923 the bituminous coal industry presents to the country its usual contradictions. The one complaint common to most of the coal mining territory is that of "car shortage" yet the outstanding fact is that in spite of a miner's election day and the Christmas holidays, these coal mines produced in December, 1922, over 46,000,000 tons of soft coal. An actual shortage of anthracite has kept domestic consumers on the verge of a buyer's panic, restrained only by the cooperation of the larger coal operators with the Federal and State fuel distributors, yet the 46,000,000 tons of soft coal was probably sufficient for the country's needs for current consumption, even in December, if evenly distributed. The fact that low coal reserves in the hands of the consumers are not being rapidly replenished doubtless adds to the fear of scarcity, yet a full-car-supply for the country's soft coal mines, as rated by the railroads, would have furnished transportation in December for more than 75,000,000 tons, or 20,000,000 tons more than the country ever took from the mines in a single month. Plainly, "100 per cent car supply," as based on such inflated ratings, would create a car surplus or a coal surplus far beyond the ability of the market to absorb.

Too Many Coal Mines

Interesting comment is made on the subject of overdevelopment, the commission stating that this study already has convinced it that underlying these immediate causes of scarcity and high prices, labor difficulties and transportation deficiencies, are other causes including the irregularity of demand and overdevelopment of the mining industry. It is stated that the mining capacity is in excess even of maximum requirements, although this country has never been able to absorb in a year more than 579,000,000 tons of bituminous coal. The present capacity of the mines, it is pointed out, is well above 800,000,000 tons.

The steady increase in the army of bituminous coal miners during the last four years, notwithstanding a lessened demand for their product, is also a fact that stands out in the statistical records furnished the commission by the U. S. Geological Survey. In 1918, the year of maximum coal output, when 579,000,000 tons were mined, 615,000 men were employed in the bituminous coal mines, nearly 622,000 the next year, over 639,000 in 1920, and in 1921, 663,000 mine workers were employed in producing about 416,000,000 tons. To get a year comparable in soft coal output with 1921 we have to go back to 1910, when 417,000,000 tons were mined, and it is significant that in that year less than 556,000 mine workers were employed—or about a million more tons of coal with 100,000 fewer miners.

The difference between 1910 and 1921 may be viewed by the consumer of bituminous coal somewhat as follows: The manufacturer who bought 10,000 tons of steam coal in 1910 paid for the year's labor of 13⅓ mine workers, whereas if he bought the same amount of coal in 1921 he paid the wages of nearly 16 mine workers. This plainly is not progress, but the mistake must not be made of blaming the miner for a decreased output, for the average miner's daily output in 1921 was 4⅛ tons, taking the 8000 commercial mines, large and small, in the United States, and in 1910 his daily output was about 3½ tons, although this difference is attributable in part to the increased use of machines. But in 1910 the average bituminous coal mine was operating 217 days, as against 149 days in 1921.

Excess Investment and Excess Miners

The commission is also taking into consideration the season's character of coal movement which is declared to be a serious handicap to the railroads, while it is pointed out that the unequal distribution of work between mines attributed by many persons to the assigned and private car system is also being considered by the Interstate Commerce Commission. As for the public, it is stated, the cost of maintaining an overdeveloped industry is reflected in the high prices of coal.

"We do not know accurately the extent of burden, but it may well be measured by the cost of keeping in the industry an excess of perhaps 200,000 miners and their families and the excess investment in mines.

"The commission is convinced that there can be no permanent peace in the industry until this underlying cause of instability is removed. Diverse causes have apparently promoted overdevelopment and inquiries are in progress as to the relative importance, among others, of the following: The policy of railroads toward encouraging the opening of new mines and new mine fields as sources of revenue; car distribution rules that permit, if they do not encourage, larger capacity than the market obviously requires; the opening of new mines by large consumers; the establishment of freight rates that encourage the development of new fields; shifts in centers of consumption that abandon old fields and encourage new fields; the difference between union and non-union wage costs; large scale suspensions in the unionized fields; and irregularity of demand.

Coal Storage a Partial Remedy

"A preliminary survey indicates that much can be done to overcome irregular demand by encouraging the storage of coal, and the commission cannot stress too strongly the great advantage of coal storage during the spring and summer for fall and winter use. This recommendation should apply to all consumers of coal—the railroads, the public utilities, the industries, and the home—and on the measure in which it may be adopted will largely depend the evenness of distribution and the cost of coal to the public during the season of heavy consumption. In addition, it will contribute to more continuous operation of the mines during the summer, distributing employment more evenly throughout the year, thus tending to stabilize the industry. Coal storage, generally adopted by the consumer, large and small, would benefit the carrier systems of the country by equalizing their load. It should have the effect of reducing the price of coal to the consumer.

"The way in which to reduce the overdevelopment of the mining industry is fraught with so many complications, not all of which are evident at first glance, that the commission has not yet had time to ascertain sufficient facts on which to base any recommendations now to be made to the Congress. While it might be expected that in an overdeveloped industry aggressive competition would have driven out mines with high producing costs and forced prices to the consumer down to a minimum, so many such complex factors have operated to prevent the free play of economic forces that a very detailed and comprehensive investigation is required before a valid conclusion can be reached."

Rule Against Labor Union Membership Sustained

The Massachusetts Superior Court holds that a company legally may make a condition of employment that those whom it hires must abandon labor union membership. This finding is contained in the court's opinion on a bill in equity brought by the Moore Drop Forge Co., Springfield, Mass., against officers and members of local unions and against the Springfield Central Labor Union to prevent interference with the company's business. Since 1921, following a settlement of a strike by employees, the company has insisted that men entering its employ shall sign individual contracts which stipulate they shall not be members of a union.

Calorific Value of Steel-Making Elements

Rôle of Silicon in the Bessemer and Open-Hearth Furnace —Proper Use of Aluminum—Magnesium As a Deoxidizer

BY HENRY D. HIBBARD

[The first part of this discussion covered the rôle of oxygen and carbon in the blast furnace and open-hearth furnace and was published in the issue of Jan. 11.]

Silicon

Silicon to SiO_2, 7595 calories: Silicon when burnt with oxygen forms the oxide silicic acid or silica (SiO_2) which, at steel melting temperatures, say from 1400 to 1600 deg. C. or even wider limits, is the strongest acid used in steel metallurgy. It will seize upon and satisfy itself with the strongest bases with which it comes in contact to form subsilicates before other acids present can combine with any of them.

The behavior of silicon in the steel-making processes is controlled chiefly by temperature and by the supplies of oxygen and carbon which have access to it. In all of the usual variations of the ways in which crude iron is changed chemically into a more valuable product, namely, washing, puddling and the open-hearth and Bessemer steel processes, the silicon in the crude iron is the first of the nonferrous ingredients to be oxidized, as would be anticipated from its superior calorific power. It is oxidized quite completely, going, except as noted, into the slag to form silicates. Exceptions will be discussed later.

When molten crude iron is contacted with a limited quantity of molten oxide of iron at certain moderate temperatures, about 1300 to 1350 deg. C., the silicon in the iron will, because of its greater calorific power, react with the oxide forming silicic acid while an equivalent of iron will be reduced from the oxide to the metallic state. This reaction produces a surplus of heat. The oxidation of the silicon produces 7595 calories per kilogram while the reduction of oxide of iron, Fe_2O_3, to yield enough oxygen to satisfy the silicon, consumes 4836 calories, leaving a surplus of 2759 cal. In the reaction one kilogram of silicon reduces about 3½ kg. of iron from its oxide. When carried out in a closed vessel the negative reaction raises the temperature of the charge. This chemical action of silicon is utilized in making washed metal by the washing process.

If there be present a large excess of oxide of iron the silicon may acquire the oxygen it needs in reducing higher oxides to lower without proportionate reduction of iron to the metallic state.

At certain higher but still moderate temperatures, from 1450 to 1550 deg. C., silicon will decompose to some extent the oxide contained in molten iron, seizing their oxygen with the same reaction as that mentioned above. Seemingly silicon should be able to reduce from its oxide any element occurring in iron except carbon. It is, however, able to reduce but little, if any, manganese, as will be noted later. In fact, the reduction of oxides of iron (FeO and Fe_2O_3), dissolved or suspended, by silicon may be incomplete. The Fe_3O_4 not reduced and the SiO_2 formed are infusible and in suspension in the metal as solid particles. Silica fuses at 1750 deg. C. and Fe_3O_4 at 1538 deg. C. It is in promoting the cleaning of the unfinished steel of these and other oxides that manganese exerts its beneficial action in preventing steel being redshort, as will be described later.

Silicon in the Bessemer Process

In the Bessemer process silicon in the crude iron furnishes by its oxidation most of the heat required to keep the charge fluid and carry on the operation. It is burnt by the oxygen of the air blast to a solid or liquid which remains in the vessel, and not to a gas which, escaping, would carry off heat as does the nitrogen of the air blown in and the CO and CO_2 formed by the combustion of the carbon.

At the beginning of the blow when the temperature is moderate, but little above the melting point of crude iron, it seizes nearly all the oxygen of the air which enters, not permitting the other oxidizable elements, particularly the manganese, carbon and iron, to have much if any. That is in accord with the law of heat generation referred to, the calorific power of silicon being greater than that of the other elements named except carbon. Evidently at the moderate temperature of the charge at that period (about 1400 deg. C.) the affinity of silicon for oxygen is greater than that of carbon which is oxidized later in the blow.

When the temperature of the charge rises unduly, as sometimes happens, due in part perhaps to excessively high silicon content in the crude iron, a degree of heat above which silicon does not burn may be exceeded and a large residual amount, sometimes over 1 per cent, remains in the blown metal after the carbon is practically all gone. Steel ingots made from such metal are exceedingly gaseous and unsound.

The explanation of this behavior of silicon at too high a temperature may be either (1) that the dissociation temperature of silica has been exceeded so that no more can be oxidized or (2) that the affinity of carbon for oxygen has been so increased by the high temperature that it seizes all the oxygen of the blast and leaves none for the silicon. The evidence seems to point to the latter as the correct reason.

Some of the silica formed in the Bessemer blow, say 0.02 or 0.03 per cent, remains suspended or entrained in the metal in the form of minute infusible particles which are at the end fluxed more or less completely by the oxide of manganese formed by the union of a part of the manganese added with a part of the oxygen of the oxide of iron contained in the metal. The entrained silica, oxide of manganese and unreduced oxide of iron combine to form fusible silicates of those bases which coalesce into globules, extremely minute in size at first but which grow by joining each other when they touch until they are large enough to be floated by gravitation when, if the metal is quiet, they move toward the surface.

These sonims, as they are called, infest the finished steel more or less abundantly according to the point of time at which the manganese additions are made, that is, whether in the vessel or in the ladle, and the length of time which the steel remains fluid after the additions. The sonims continually leave the steel after formation by rising to the top at rates depending on their sizes. The larger they are the quicker they rise.

Silicon in the Open-Hearth Furnace

In the ordinary basic open-hearth process silicon plays an unimportant role. It is oxidized early in the progress of the heat and enters the slag where, lest it interfere with dephosphorization, it must not form too large an ingredient. In this process no silicon is reduced from the slag or bottom. There is too little silica in the slag and too much oxygen in oxide of iron is carried to the metal by the slag to permit of its reduction.

In the pig and scrap variation of the acid open-hearth process, formerly in common use, the charge consisted in great part of steel scrap with enough pig to give the metal when all was melted a little more than the desired content of carbon. The excess of carbon was partly diluted and partly worked or boiled out by scrap added to the bath, such as pieces of rail or wrought iron blooms, which were preheated in another furnace and added redhot. No ore was used.

Usually the silicon was mostly or wholly oxidized during the melting-down period but not always, as the experience now related will show. We were making

acid spring steel and the proportion of pig iron (and hence of silicon) in the charge was accordingly high to give the required carbon. The pig constituted 25 per cent of the charge and contained 1.5 per cent of silicon, which was higher than that in the pig we had been using. In such iron the higher the silicon the lower the carbon content, so we could not use less or our carbons would have been too low. Including the little silicon there was in the steel scrap, that element constituted about 0.35 to 0.40 per cent of the whole charge, over one-half of which sometimes remained in the metal when all was melted. The furnaces were quick melters, the producer gas being unusually good, and the 12 tons of cold charge were melted in about 5 hrs. from the beginning of the charging. When melted the charges lay dead in the furnace with scarcely a bubble of gas escaping from the bath. The silicon and carbon contents remained practically stationary and were only lessened when diluted by additions of metal low in carbon and silicon. We could get the carbons about what we wanted, 0.85 to 0.90 per cent, but the silicon contents ran from 0.25 to 0.30 per cent. This steel was objected to by our customers, the spring makers, as it did not respond, as did the low silicon steels, to their hardening and tempering methods. If they could have heat-treated it properly it was very likely better than the kind they demanded.

That residual silicon which survived melting troubled us. At that time the pig and ore processes had not been developed in this country and we did not know how to use ore, though we did know vaguely something of its reaction with crude iron and felt that it ought to be able to oxidize and so eliminate that silicon. So we started adding it in small doses and, though no effect was visible except a little bubbling around each lump of ore, we found by analysis that the silicon in the finished steel was lessened a little. We therefore used more and more ore in later heats and finally were able to bring about the quiet normal boil which took place when the metal contained about 0.10 per cent of silicon.

This survival of unoxidized silicon probably can occur only in the acid process. In the basic process the oxidizing conditions are so strong that, though a larger percentage of crude iron is used than in the acid process, it has a lower silicon content which is completely oxidized before the carbon has been worked out to the desired percentage.

The heat generated by the oxidation of the silicon in the open-hearth process is not enough in quantity to noticeably affect the temperature of the charge as in the Bessemer process, though it must be taken into consideration in making a heat balance, which accounts for the heat supply and expenditure of the process.

Silicon will, it is claimed, protect vanadium from oxidation in the open-hearth process, and may be eliminated from the metal by oxidation, while the vanadium will remain. This is what would be expected from the calorific powers of the two elements.

As already described under "carbon" some silicon is reduced from silicic acid by carbon at a sufficiently high temperature in the blast furnace, in some variations of the crucible steel process and in some variations of the acid open-hearth process. Silicon so reduced is an important constituent of crude iron and of crucible steels and in a less degree of some open-hearth steels, notably those for cannon.

Rôle of Silicon

While silicon has some value as an alloy in certain steels, imparting to some kinds superior physical properties and to others improved electrical or magnetic properties, its great function in steel is as a preventer of gasholes, often called blowholes. If the metal is not excessively charged with gases the addition of 0.3 to 0.4 per cent of silicon will kill it so that the ingots made from it contain no gasholes. This action of silicon on the elementary gases, particularly hydrogen and nitrogen, must manifestly be one of solution, keeping these gases dissolved in the metal until it has solidified. With compound gases such as carbonic acid and carbonic oxide, it has been a moot point whether they were dissolved or dissociated or prevented from forming.

Laboratory experiments have been reported in which carbonic oxide has been reduced by passing over silicon at some elevated temperature (far below that of molten steel, however), the carbon being set free and deposited, and the oxygen uniting with the silicon. It seems likely that at or above some temperature about 1550 deg. C., the temperature of molten steel, the affinity of oxygen is greater for carbon than it is for silicon, while at lower temperatures, perhaps below 1400 deg. C., its affinity for these elements is reversed. Silicon, therefore, probably prevents the separation of carbonic oxide and the formation of gasroles by it by keeping it in solution and not decomposing it.

Silicon as a Deoxidizer

Silicon has been called a deoxidizer of molten steel, but in such a way as to give the incorrect impression that killing steel is equivalent to deoxidizing it. Steel has been made which was killed with silicon, without any addition of manganese and yet was about as red-short or brittle, when attempted to be rolled, as if composed wholly of slag. The oxides of iron may have been and probably were largely decomposed with the formation of silica, but the latter remained as infusible non-metallic matter even more harmful to the quality of the steel than the oxides of iron it destroyed. Judging from the way in which the grains separated when the heated steel was passed through the rolls, the silica particles had probably collected along the grain boundaries being rejected by or expelled from the metal as it solidified in forming the grains.

Thus while silicon is undoubtedly a deoxidizer in the sense that it will to a considerable extent decompose oxide of iron as stated, measures must be taken to rid the metal of the silica formed and that is one of the functions of the manganese added to acid steel. A part of the manganese is oxidized, the oxide formed unites with the silica and the resulting globules of silicate of iron and manganese formed are the sonims already referred to.

Aluminum

Aluminum to Al_2O_3, 7270 calories: The only proper use of aluminum in steel metallurgy is as a solvent for the gases which might, if not checked, form gasholes in the ingots or castings. It has indeed a strong affinity for oxygen and has been used as a deoxidizer for steel, that is, has been added to the unfinished metal while it still contains oxide of iron which calls for elimination. The power of aluminum to decompose such oxide as it comes in contact with is undoubted. It seizes the oxygen forming Al_2O_3 and liberates the iron which merges with the bath. But the oxide of aluminum formed is perhaps as bad for the quality of the steel as the oxide of iron it has destroyed. It is infusible at the charge temperature and so does not coalesce into relatively large masses except when stuck together by some fusible or at least pasty ingredients such as silicates of manganese and iron, singly or together. Hence it is likely to remain and exist in the finished steel as so much foreign matter to the detriment of its quality. The metal should be thoroughly deoxidized by the action of manganese or carbon and time be allowed for the elimination of the products formed thereby before the aluminum is added when its function as a gas-solvent alone is desired.

Besides the prevention of gasholes in steel the solvent power of aluminum has also an application in moderating the activity of gas evolution in effervescing steels (described later), when the churning in the molds is too violent. If not checked, the ingots settle as solidification proceeds. leaving a shell or pipe on top, making the ingots under weight and demanding an unduly large top crop after rolling.

As in the case of silicon laboratory experiments have been reported in which aluminum decomposed carbonic oxide gas passed over it at an elevated temperature (well below that of melted steel), Al_2O_3 being formed and the carbon being set free in the solid state. So aluminum, like silicon, evidently prevents the formation of gasholes in solidifying steel by solution and not by decomposition. It seems to have a particularly strong solvent power for hydrogen which presumably forms

the skin-holes. No way has yet been devised or worked out by which burning carbon can be made to reduce aluminum in any considerable quantity from the oxide by its own heat and reducing power. Yet aluminum has a lower calorific power than silicon of which an important amount is reduced in the blast furnace.

Magnesium

Magnesium to MgO, 5975 calories: This element, having strong affinity for oxygen, has been proposed as a deoxidizer for steel, but, as in the case of aluminums, the product of such deoxidation, magnesium oxide, formed when magnesium or a magnesium alloy is added to unfinished steel, is perhaps as harmful as the oxide of iron it is added to destroy. The magnesium oxide is lighter and hence more bulky, is infusible and not easily fluxed or agglomerated. Hence as a cure it may be worse than the disease. If united with silica as silicate of magnesia it is still infusible in the metal and hence harmful.

Frankly, however, the value of magnesium as an addition to fluid steel remains to be demonstrated. In adding magnesium to any molten oxide of a metal having a smaller calorific power its oxidation takes place with almost explosive violence. If it is to be added to steel it must manifestly be previously alloyed with iron and the alloy added to the molten steel.

(To be concluded)

REDUCING INDUSTRIAL WASTES

Cutting of Excess Varieties and Styles in Different Commodity Lines

WASHINGTON, Jan. 12.—The avoidable waste in American industry is being rapidly eliminated, as shown in an industrial survey just made by the fabricated production department of the Chamber of Commerce of the United States. Much of the progress made, according to a statement issued today by the department, is due to cutting down the number of excess varieties and styles in the different commodity lines.

"However," the statement continues, "the evil of waste, in varying degrees of seriousness, is still present. It has been conservatively estimated that the avoidable waste in production is fully 25 per cent. That means one-quarter of all the effort, time and money expended in American factories is utterly lost. Admittedly many sources contribute to this 25 per cent and no one element is responsible for all. Yet we are told that excess variety and lack of standardization is one of the most outstanding wastes chargeable to management.

"In numerous commodity lines varieties have been pyramiding to such an extent that the science of mass production, for which America is known the world over, is being lost. It would seem that one of the most essential lessons taught by the war has been entirely forgotten. There has been much catering to the whims and fancies of the customer, and a persistent endeavor to satisfy the insatiable demand for something different.

"In production, small variety and large volume is the ideal. The possibilities are present to a varying extent in all industries. To realize this idea, simplification and standardization is vitally necessary, in fact, of first importance and consideration. Each line must pay its way and justify its continuation.

"Furthermore, simplification and standardization need not be confined to the completed product. Its application is being extended to such items as: crates, cartons, accessories, component parts, colors, brands, grades, finishes, capacities, performance, terminology and specifications. Each of these present possibilities for worthwhile saving.

Individuality Not Stifled

"It must be observed that to simplify in no way implies reducing a product to a common pattern, nor does it tend to stifle individuality or hamper advancement. On the contrary, it has been conclusively demonstrated that development and progress is greatly facilitated because efforts can be concentrated on fewer items. Among the chief functions of simplification are: elimination of waste, increase of productivity, better service to the public.

"The question may now properly arise as to how simplification can be carried out. Two methods of proved success suggest themselves:

a. By individual efforts.

b. By cooperative efforts of an entire industry through an association.

"Regardless of their competitors, many concerns appreciating the economies of simplification have determined to supply what is necessary for the trade and to eliminate the excess. The result of such a policy has been very tersely stated by a manufacturing executive: 'We have increased our productive effectiveness in direct ratio as we simplified our output.'"

The fabricated production department of the national chamber, in cooperation with Secretary of Commerce Hoover, has examined over 300 commodity lines, and in most of them has influenced beneficial changes. In car wheels 175 varieties have been reduced to 4; in farm implements the reduction has been from 1092 to 137; in hammers, axles, etc., from 2752 to 761; in pipe fittings, from 17,000 to 610; in reinforcing bars, from 24 to 11; in shafting, from 60 to 14, and in steel lockers, from 37 to 9.

World Shipbuilding Shows Loss

Although world shipbuilding is now slightly above the pre-war figure in the volume of orders placed, it is still well under the 1914 total in the amount of work on which construction is actually proceeding, says a statement issued by Lloyds Register of Shipping, covering the returns for the quarter ended Dec. 31.

Contracts involving the building of 564,000 tons of merchant vessels have been suspended throughout the world, Lloyd's Register adds, and of this amount 348,000 tons represents the orders on which work has been stopped in Great Britain and Ireland alone, or 132,000 tons more than for all the rest of the maritime nations combined.

Compared with the previous quarter, the total of work unfinished shows an increase of about a quarter of a million gross tons, but included in this is the volume of work in the hands of the shipyards of Germany and Danzig, which was not given in the previous quarter's total and which, if now excluded, would show a decrease instead of a gain during the past quarter. The returns show a further drop in the amount of tonnage building in American shipyards, the American total now being below the pre-war figure of 148,000 tons. Comparisons for the two quarters are as follows, in gross tons:

	Jan. 1, 1923	Oct. 1, 1922
United States	139,448	150,623
Great Britain and Ireland	1,468,599	1,617,045
Other countries	1,346,271	934,888
World total	2,954,318	2,702,556
Less Germany and Danzig	464,877	
Actual comparison	2,489,441	

The actual showing for the last quarter, therefore, is a loss in unfinished orders of over 200,000 gross tons. If consideration is given, however, only to construction on work which is actually proceeding, it will be seen that the present total is more than half a million gross tons below the pre-war level, even including the work in Germany and Danzig. Taking into account the suspensions of work ordered throughout the world, Lloyd's Register gives the following comparative table of gross tons of shipping being built now and before the war:

	Jan. 1, 1923	July 1, 1914
Great Britain and Ireland	1,120,599	1,747,000
Other countries	1,269,719	1,199,000
World total	2,390,318	2,946,000

These figures show a reversal of pre-war conditions in that British shipyards, which in 1914 were building 46 per cent more tonnage than all the other maritime countries combined, are now constructing less than half of the world's output.

Ruhr Valley a Great Industrial Center

Large Percentage of Germany's Production of Ore, Iron and Steel Comes from District Now Occupied by France —Probable Effect on American Exports

THE Ruhr Valley, which has been invaded by France, is of very great economic importance. Statistics as to production during and since the war vary according to different authorities, and it has been very difficult to obtain correct information as to production in Germany since the war. The latest estimate of production for 1922 is that the Ruhr and Rhineland, which was occupied by the Allies prior to the recent invasion, produced 7,300,000 tons of iron ore or 41.1 per cent of the country's total, 8,200,000 tons of pig iron or 74.5 per cent of the total, 91,000 tons of zinc or 44.4 per cent, and 43,000 tons of lead or 40.2 per cent. A Washington authority states that 65 per cent of the total German steel output is usually made in the Ruhr and that the German production in 1922 was about 9,000,000 tons of ingots.

Map Showing Location of Ruhr Region with Reference to London, Paris and Berlin

M. Darriac, sent by Premier Poincare to investigate conditions in the Rhine province, said in an article published by the Manchester *Guardian* on Nov. 3, 1922:

"The Ruhr constitutes the principal element of German wealth, which is based entirely on iron and coal, their transportation and derivatives. The 10 or 12 industrialists who rule the great German consortiums centered in the Ruhr control absolutely the economic destinies of Germany.

"A few figures recall the importance and prosperity of the Ruhr. Of 191,000,000 tons of coal produced in 1913, 115,000,000 came from the Ruhr. The by-product of coal (500,000 tons of ammonium sulphate, 400,000 tons of tar, etc.) came from the Ruhr to an extent of 25 or 30 per cent. The steel production of Germany exceeded 19,000,000 tons in 1913, of which 10,000,000 tons was produced in the Ruhr.

"The hold of this district given by the military sanctions which have never been removed, gives the French a power to utterly disorganize German industry. They could easily separate metallurgical establishments from their coal and ore resources.

"The production of four important industrial groups is given in tons as follows:

France now holds the entire Ruhr coal field and industrial district. Monday the troops advanced to the outskirts of Dortmund on the extreme eastern edge of the coal basin, and Tuesday entered that city. Bochum, where the great Stinnes steel and iron plants are situated, has fallen into the hands of the French. It was estimated that after Monday's movement about 70 per cent of the Ruhr coal production was controlled by the French. Last week the French marched up from Duesseldorf through Ratingen to encircle and finally occupy Essen. Sunday they began another cautious encircling move, with Bochum as its centre. After they had established themselves in the neighboring towns, they entered the Stinnes stronghold.

	Stinnes	Krupp	Thyssen	Haniel
Coal	18,300,000	5,500,000	5,500,000	7,700,000
Coke	4,500,000	1,900,000	1,800,000	1,600,000
Tar	129,000	54,000	57,000	22,000
Sulphate of ammonia	59,000	22,000	25,000	10,000
Cast iron..	2,115,000	1,500,000	1,200,000	800,000
Steel	2,600,000	1,300,000	1,200,000	850,000

"Likewise the Phoenix group of Duisburg produces 5,000,000 tons of coal. The Rheinische Stahlwerke produces 5,000,000 tons of coal and 600,000 tons of cast iron.

Position of the Allies

"So long as we maintain our present position on the Rhine we shall thus constitute a constant menace for the 10 or 12 masters of German industry who are in reality financially the masters of Germany. If any Germany is to pay us, it will be the Germany of the Stinnes, the Thyssens, Haniels, or Krupps, or the great syndicate, the true holders of German capital.

"In case of the insolvency of Germany, we can allow full scope to the functioning of the German metal industry, can at the same time reestablish the customs barrier between our bridgeheads and the unoccupied territory, and thus levy on inward and outward goods such duties as would replenish the reparations chest.

"It is a hackneyed conclusion that the French metal industry can not live without German coke, and that the German metal industry can reach only half its full development if deprived of French ore. At present the German metal industry is creating new means of production and organizing its future. Industrialists who have lost their Lorraine holdings have been indemnified by the German Government and have diverted their capital to the right bank of the Rhine to construct there establishments to replace those which they have lost.

"We can not demand that Germany shall pay enormous sums for 55 years and on the other hand be afraid to see her industries develop in proportion which would permit her to pay the debts she acknowledges; but so long as we are masters of the 45,000,000 tons a year of ore and so long as we have a hold on the right bank of the Rhine, we shall be in a position to play the decisive part in the German metal industry and maintain the control of production.

"German industrialists profess openly that the union of German coke and French ore would have great results and if the two peoples should conclude agreements directly with one another, of which the Wiesbaden agreement is but the prelude, all problems would simplify themselves rapidly. Our occupation of the Düsseldorf bridgehead should lead us with a little skill to the realization of the only two methods of payment which will give us real satisfaction; a German loan secured on German capital; and the recovery of economic life."

Effect on American Trade

Of special interest at this time is the question as to the effect which French occupation of the Ruhr district will have on foreign commerce. An expert on foreign trade expresses the opinion that American exports will suffer. He gives his views as follows:

"Through occupation of the Ruhr, France expects to secure 1,000,000,000 gold marks per annum, to be obtained by tax on exports from the Ruhr. This sum by no means measures the degree of dislocation of German industry and impairment of her purchasing power. American exports will suffer.

"A.—German purchasing power would be curtailed, reducing the export of American staples, cotton, copper, meats.

"1. Within the Ruhr are concentrated the leading industrial interests (Stinnes, Krupp, Thyssen, Haniel, Bayer); 800 corporations with 20 per cent of the entire German capitalization; 65 per cent of the yield of rolling mills; 65 per cent of the ingot steel; 55 per cent of the pig iron; and 20 per cent of the iron ore.

"These are now German. Transfer to French control means less efficiency, loss of secret processes, flight of capital, lower production, all involving less power to purchase American goods.

"2. Germany outside the Ruhr depends in that area for 60 per cent of its coal and 72 per cent of its coke. France would through taxes impede such shipment and heavily curtail German production, ability to export, consequently the ability to pay for purchases from America.

"Germany bought $372,000,000 worth of foods from the United States in 1921. This sum would decrease in case of French occupation, in direct ratio with the decrease in German production.

"B. The United States could not take Germany's place in the world's market.

"Our imports from Germany in 1921 were $80,000,000. Some of this business would go to domestic manufacturers of specialties and novelties. The orders by other centers from Germany called for lines in which the United States could not compete with European source of supply. In many instances the orders would not be filled at all because German industrial disturbance and French occupation would upset all markets and bring in depression.

"C. The French contend that under their administration an integration of industry in the Ruhr and Lorraine would follow, as under the German customs union when both areas were administered by Germany. But mergers of capital and integration of industry are based upon the utmost efficiency, stability and confidence. These elements cannot exist for years in an area torn by political strife. Relocation of industry since the war has caused all enterprises to move away from national boundaries toward the interior."

Industrial Conditions in France

WASHINGTON, Jan. 16.—Effective Dec. 29, a decree of the French Government prohibited the exportation of waste and scrap to all countries, except Italy, says a cable to the Department of Commerce from Commercial Attache C. L. Jones, Paris, and is due to the situation in the iron and steel industry of France.

Pig iron production increased in December, but there was a decline in steel output, with prices firm and rising, along with expectation of higher production costs. The prices of raw materials are increasing and French transportation rates are still high on many lines. Labor is demanding an increase in wages. Outlook for export trade is declared to be uncertain because of exchange difficulties.

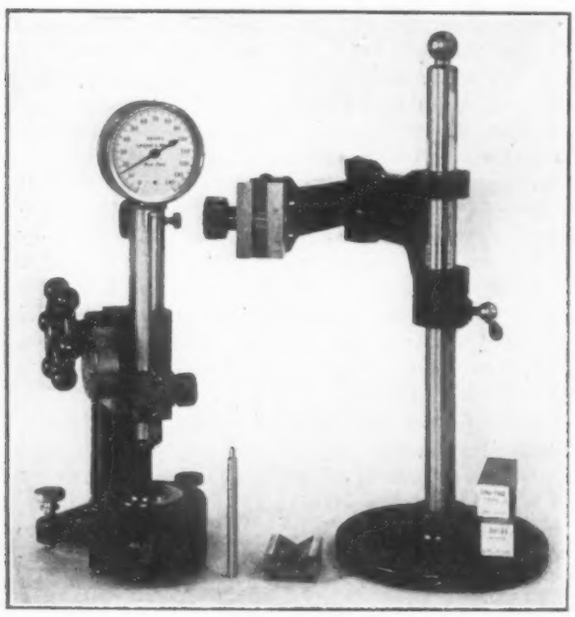
The coke shortage is increasing; reparations deliveries amounted to 80,000 short tons in December. The price of British coke is rising, and arrivals of coke are in an unsatisfactory condition on account of transshipment, the blowing out of furnaces owing to lack of fuel being expected. Demand for iron and steel is less strong due in part to the announcement of the reduction of the budget item to supply money for reconstruction. The market for heating apparatus is good. The Syndicate des Fondeurs de France has been renewed for one year instead of the customary six months. The Comptoir des Toles et Larges was dissolved on Dec. 29, while the Comptoir Siderurgique also was dissolved because of dissatisfaction over allotments. The Societe Cokes de Hauts Fourneaux was re-established as of Feb. 1. Except in the devastated regions, building activities are at a standstill.

Frank K. Starkey, Hartford, Conn., addressed the New York Chapter of the American Society for Steel Treating, Wednesday evening, Jan. 17, on "Spark Test Method for Testing Steel."

A Dial Recording Scleroscope

The scleroscope has been provided with permanent indicating mechanism, a pointer hand and graduated dial. This feature is to be contrasted with the original model classified as model C-1, in which the vertical graduated scale is used and against which the height of the rebound of the hammer indicating the hardness is read. The improved dial instrument is known as the model D recorder, for here, instead of the indication being momentary, the hand remains fixed an indefinite length of time or until the next test is made.

The mechanism employed consists of the usual drop hammer. The function of this hammer is, by virtue of its accumulated energy of motion, to overcome the



penetrative resistance of the metal under test. This absorbs more or less of its striking energy, which is always constant. That which is not absorbed, as most notable in the harder metals, remains available for reacting on, or rebounding the hammer itself, and which is proportional to the hardness of any metal.

The hammer employed differs from the earlier models in that it is longer, heavier and drops and rebounds a comparatively shorter distance. The mechanism consists in the main of a sensitive one-way ball clutch and pilot sleeve, which normally holds the hammer at its upper starting position. When released, the pilot sleeve falls with the hammer, with the result that the slightest rebound, even though less than one thousandth part of an inch, is instantly fixed by the one-way clutch.

Following this cycle, the clutch assembly is raised up to its starting position, carrying the hammer with it in its now superposed position, due to the percentage of rebound recorded. Simultaneously the hammer, arriving at its upper or starting position, engages and actuates a rack and pinion and hairspring dial mechanism which, in turn, indicates the amount of rebound of the hammer and, therefore, the hardness of the specimen. The hardness values shown by this instrument agree with those shown on the vertical scale, or the older instrument, which can be supplied at a somewhat lower cost. The instrument is made by the Shore Instrument & Mfg. Co., Jamaica, N. Y.

An exhibition of autographed portraits owned by J. G. Butler, Jr., was given at the Butler Art Institute, Youngstown, Jan. 5 to 15. The portraits include those of Joseph Jefferson, William H. Taft, John H. Clarke, William McKinley, U. S. Grant, Samuel Mather, King Albert I, C. M. Schwab, E. H. Gary, Willis L. King, Theodore Roosevelt, Abraham Lincoln, Pope Pius IX, A. C. Dinkey, Warren G. Harding, Cardinal Gibbons, Sir Henry Bessemer, H. C. Frick, James M. Swank, William B. Dickson and Woodrow Wilson.

Increased Cost of Manufacturing Textile Machinery

A sizable tonnage of the foundry pig iron sold in New England annually goes into the manufacture of textile machinery. Textile machinery has not advanced in price in proportion with many other lines of machinery, and in intimating a general marking up in values is likely, P. D. Howe, Saco-Lowell Shops, Boston, in justification of such action, gives a comparison of prices of 1914 and today which is highly interesting.

Taking cards (textile) as an example, he states the company's price for a 40-in. card today is $1,100, which represents an increase over the pre-war price (1914) of 83 per cent. Prices for other machinery manufactured by the company have appreciated in about the same proportion. During the same period the chief raw materials used by the company have increased as follows:

Pig iron from $15.10 delivered at the shops in 1914, to $32.50 delivered today, an increase of 115 per cent.

Coal has increased from $3.75 a ton in 1914 to $9 at the present time, an appreciation of 143 per cent. Coke has gone up from $6.45 in 1914 to $16 today, an increase of 147 per cent. On a per hour basis, labor costs have increased 105 per cent, while the amount of labor required to build a machine is much more than 105 per cent, because of inefficiency of labor today as compared with that of 1914. The increase in the expense of actual labor in one machine has increased 135 per cent, and from that varies upward to 300 per cent.

Features of the Sesqui-Centennial at Philadelphia

The Sesqui-Centennial Exhibition, which will open in Philadelphia at noon, Friday, April 30, 1926, and close Saturday, Nov. 13, 1926, will be a world festival of peace and progress. It is announced that among the great buildings in which the foreign nations as well as Americans will be asked to display evidences of their progress in the past 50 years there will be:

A vast Automobile Hall, designed to portray the progress of the automotive industry and to present the greatest collection of the most highly perfected motor vehicles from every part of the world;

A great Aeroplane Building with an aerodrome for exhibition purposes, demonstrating world achievement in the navigation of the air;

An Electrical Palace filled with the amazing wonders of electricity; supplementing the brilliant illumination of buildings and grounds and the practical uses of telephone, wireless and radio throughout;

Halls of Commerce and Industry, in which the progress of the past fifty years will be dramatized by contrast; as, for example, the original Corliss engine in direct contrast with the modern turbine; the locomotive of 1876 and the electrically-driven machine of 1926, the hand-plow of 1876 and the tractor of 1926; carrying out this method of visualization of contrast all through the exhibits.

December Sheet Sales of Independents Set New High Record

December sales of the sheets as reported to the National Association of Sheet and Tin Plate Manufacturers established a new high record with a total of 399,624 net tons, which compares with the previous high record in March, 1922, of 272,357 tons. Shipments for the month were 183,358 tons less than the new sales and this is reflected in the unfilled tonnage as of Dec. 21, which amounted to 505,766 tons. The figures in detail for December compare with those for November and October as follows:

	December	November	October
*Capacity	384,000	386,000	385,000
†Capacity reporting	66.5%	69.1%	68.9%
Sales	399,624	172,774	208,916
Production	205,239	242,562	243,476
Shipments	216,266	230,320	223,874
Unfilled tonnage, end of month	505,766	321,487	376,394
Unshipped stocks	92,500	101,698	108,291
Unsold stocks	27,500	30,084	20,690

*Based upon number of working days.
†Does not include American Sheet & Tin Plate Co.

Safety Code to Protect Foundry Workers

American Engineering Standards Committee Covers All Problems Pertaining to Foundries—Hazards of General Character Belong in General Codes

IN January, 1920, the American Engineering Standards Committee invited the American Foundrymen's Association and the National Founders' Association to act as joint sponsors for a safety code for the protection of industrial workers in foundries. These associations appointed a sectional committee, to draft such a code, consisting of the following members:

Chairman, William H. Barr, president National Founders' Association, Buffalo; secretary, H. J. Boggis, Cleveland; Benjamin D. Fuller, Niagara Falls, N. Y.; Edward Keener, president, Buffalo Cooperative Stove Co., Buffalo; H. D. Miles, Buffalo; the five men named above represent employers. J. P. Frey, Iron Molders' Union of North America, Cincinnati, representing the employees. H. S. Echternach and F. J. Hartman, secretary, Industrial Board, Pennsylvania Department of Labor and Industry, Harrisburg; F. G. Lange, Bureau of Standards, Washington; R. C. Williams, United States Public Health Service, Washington; these four representing governmental bodies. W. W. Green, Employers' Mutual Insurance Companies, New York, and B. C. Riffel, National Bureau of Casualty and Surety Underwriters, New York, representing insurance interests. S. E. Hassel, safety director American Steel & Wire Co., Pittsburgh, and George E. Sanford, safety engineer General Electric Co., West Lynn, Mass., representing technical associations.

At a meeting held Feb. 9, 1921, and attended by a majority of the sectional committee, a code was drafted which was later submitted to the entire sectional committee and to various technical organizations for criticisms. At a meeting held Feb. 14, 1922, and attended by a majority of the sectional committee, these criticisms were considered and some changes were made.

This code in its present form is the net result of this work and was approved by the National Founders' Association, the American Foundrymen's Association, the sectional committee, by letter ballot, and the American Engineering Standards Committee, in June, 1922. The membership of the two associations sponsoring this code is composed of some 3000 of the leading foundries of the United States.

Introduction

§1. *Scope.*—This code deals with foundry conditions only, omitting such subjects as building construction, exits, stairways, elevators, lighting, sanitation, etc., as these subjects are covered by other codes.

§2. *Interpretations and Exceptions.*—The purpose of this code is to provide reasonable safety for life, limb and health. It shall be liberally construed to secure results, by the enforcing officers, who shall have the authority in cases of practical difficulty or unnecessary hardship to grant exceptions from the literal requirements of this code, so long as equivalent protection is thereby secured. When the safeguarding of particular types of machines is covered by other approved codes, these other codes shall be given the preference. Where specific devices or methods are mentioned in this code, other devices or methods which will secure equally good results may be used, subject to the approval of the enforcing officer.

§3. *Application of Regulations.*—Regulations affecting industrial establishments generally, in respect to the safe-guarding of transmission machinery, miscellaneous machinery, elevators, stairways, platforms, or relating to sanitary conveniences and first-aid equipments, not included in this code, shall apply with equal force to foundries.

§4. *Suspension of Regulations.*—This code may be modified or suspended in whole or in part by the proper state authority in respect to existing foundries, if good and sufficient reason therefor is submitted.

§5. *Mandatory and Advisory Requirements.*—The word "shall," where used, is to be understood to be mandatory, and the word "should," advisory.

§6. *Definitions.*—

Rule 60. *Foundry.*—A foundry shall mean a building where iron, steel, tin, zinc, lead, aluminum or compositions containing any of the baser metals are melted and poured into molds for the making of castings, and shall include all molding, coremaking, melting, cleaning, toilet and washrooms used in connection therewith.

Rule 61. *Entrances or Exits.*—The term "entrances" or "exits" shall mean passages for common use between the foundry and the open air, provided for employees during working hours.

§7. For standard method of guarding general hazards and for sanitation, reference should be made to codes prepared under the procedure of the American Engineering Standards Committee.

Part I. Plant Layout

§10. *Entrances.*—

Rule 100. *Protection.*—Entrances to foundries located in cold climates shall be protected during the winter by covered vestibules or their equivalents, which shall be so constructed as to eliminate harmful drafts, and of such dimensions as to answer ordinary purposes, such as the passage of wheelbarrows, trucks and industrial cars.

Rule 101. *Exception to Protection.*—Section 10 shall not apply to entrances used for railroad or industrial cars handled by locomotives, or for travelling cranes, horse-drawn vehicles or automobiles; these entrances may remain open during the winter only for such time as is necessary for the ingress and egress of such cars, cranes, horse-drawn vehicles or automobiles.

§11. *Floors, Pits and Galleries.*—

Rule 110. *Floor at Cupola.*—The floor beneath and immediately surrounding a foundry cupola shall be kept free from collection of water.

Rule 111. *Cleaning and Finishing Floors.*—All cleaning and finishing floors shall be cleaned and leveled as often as necessary to secure safe working conditions.

Rule 112. *Floor Adjoining Tracks.*—The floor immediately adjoining industrial tracks over which workmen frequently pass shall be reasonably hard and flush with the top of the rails. Sufficient clearance for easy passage of truck wheels shall be provided between floor and rails.

Rule 113. *Pits.*—All pits or openings located in foundry floors shall be guarded by suitable coverings or railings where practical; where impractical a watchman should be provided.

Rule 114. *Galleries.*—Galleries where molten metal is poured into molds shall be provided with a solid partition of fire-resisting material not less than 3 ft. 6 in. high, installed on the open side of such gallery.

§12. *Gangways.*—

Rule 120. *Definitions.*—The term "gangway" shall mean a well-defined passageway dividing the working floors of a foundry. The width of a gangway shall be understood to be the clear distance between molds, posts, partitions or other obstruc-

tions on one side of the gangway and similar objects on the other side.

Rule 121. *General Gangways.*—Gangways other than those for carrying molten metal shall be of sufficient width to allow the passage of employees and materials, and shall be illuminated in accordance with the requirements of the Factory Lighting Code.*

Rule 122. *Condition.*—Every gangway in which molten metal is being handled shall, during the progress of pouring, be kept in good condition, clear of obstructions and free from undue dampness.

Rule 123. *For Crane, Trolley or Sulky Ladles.*—Gangways where molten metal is carried in crane, trolley or sulky ladles shall be sufficiently wide to allow employees safely to handle and empty the ladles.

Rule 124. *For Truck Ladles.*—Gangways where molten metal is carried in truck ladles exclusively shall be not less than 18 in. wider than the extreme width of the truck ladle.

Rule 125. *For Crucibles.*—Gangways where molten metal is carried in crucibles by not more than two men per crucible, and poured into molds placed on one or both sides of the gangway, shall be not less than 3 ft. wide.

Rule 126. *For Crucibles.*—Gangways where molten metal is carried in crucibles by more than two men per crucible, and poured into molds placed on one or both sides of the gangway, shall be not less than 4 ft. wide.

Rule 127. *For Hand or Bull Ladles.*—Gangways where molten metal is carried in hand or bull ladles by not more than two men per ladle, and poured into molds placed on only one side of the gangway, shall be not less than 3 ft. wide.

Rule 128. *For Hand or Bull Ladles.*—Gangways where molten metal is carried in hand or bull ladles by not more than two men per ladle, and poured into molds placed on both sides of the gangway, shall be not less than 4 ft. wide.

Rule 129. *For Hand or Bull Ladles.*—Gangways where molten metal is carried in hand or bull ladles by more than two men per ladle shall be not less than 5 ft. wide.

§13. *Aisles.*—

Rule 130. *Definitions.*—The term "aisle" shall mean a passageway between molds leading from the gangway. The width of an aisle shall be understood to be the clear distance between molds, posts, partitions or other obstructions on one side of the aisle and similar objects on the other side.

Rule 131. *Condition.*—Every aisle in which molten metal is being handled shall, during the progress of pouring, be kept in good condition, clear of obstructions and free from undue dampness.

Rule 132. *For Hand or Bull Ladles or Crucibles.*—Aisles where molten metal is carried in hand or bull ladles or crucibles, and poured into molds on individual floors by not more than two men per ladle or crucible, shall be not less than 12 in. wide except where molds alongside the aisle are more than 20 in. high above the aisle level, in which case the aisle shall be not less than 24 in. wide.

Rule 133. *For Hand or Bull Ladles or Crucibles.*—Aisles where molten metal is carried in hand or bull ladles or crucibles, and poured into molds on individual floors by more than two men per ladle or crucible, shall be not less than 36 in. wide.

Rule 134. *For Crane, Trolley or Sulky Ladles.*—Aisles where molten metal is carried and poured into molds on individual floors by crane, trolley or sulky ladles shall be sufficiently wide to handle and empty the ladles safely.

Part II. Machines and Equipment

§20. *Equipment.*—

Rule 200. *Slag Spouts.*—For protection against the spattering of slag, slag spouts should, where practicable, be equipped with suitable shields.

Rule 201. *Lip-Pouring Ladles.*—All lip-pouring ladles of 1000 lb. capacity or more shall be equipped with a worm gear or other self-locking device.

Rule 202. *Crane, Truck and Trolley Ladles.*—All crane, truck and pulley pouring ladles shall be equipped with a dog to prevent premature overturning, and shall be so constructed that when they are full of metal the center of gravity shall be below the center of the trunnion, unless each ladle is equipped with a gear mechanism and a latch, either of which will prevent premature overturning of the ladle.

Rule 203. *Single Shank Ladles.*—All single shank ladles should be provided with sheet metal shields.

Rule 204. *Crown Plate of Furnace.*—Where the crown plate of an upright crucible furnace is elevated above the surrounding floor in excess of 12 in., the furnace shall be equipped with a platform having a standard rail; such platform shall be constructed of metal or other fire-proof material, and shall extend along the front and sides of the furnace, flush with the crown plate, and shall be clear of all obstructions. If the platform is elevated above the floor in excess of 12 in., the lowering from it of crucibles containing molten metal shall be by mechanical means.

Rule 205. *Sand Buckets.*—Equipment for the movement of materials by overhead cranes, such as sand buckets, shall have a factor of safety of at least 5, including bolts where used. When buckets have movable bails, safety locks or catches shall be provided, and the use of such safety locks or catches shall be enforced. Substantial steel handles shall be provided on grab buckets to afford safe means of pulling or prying apart the jaws, in case cylinders stick.

Rule 206. *Sling Beams.*—Sling beams shall be so so constructed that the slings can not be jarred off the beam, and so that the slings can be readily moved to accommodate different size flasks.

Rule 207. *Trunnions on Flasks.*—Trunnions on flasks hereafter constructed shall be carefully designed for the loads they are to handle, and constructed with a factor of safety of at least 10, including bolts where they are used. The diameter of the button shall be equal to the diameter of the groove plus 1½ times the diameter of the sling used to handle the flask. Inside corners shall be well filleted and, in order to prevent the sling siding off or riding the button, the radius of the corner between groove and button shall be approximately equal to the radius of the sling used, the remainder of the inside edge of the button to be straight.

Rule 208. *Slings.*—All slings used to suspend flasks from jib crane beams shall either be so designed that there are safe clearances for a hand grip or handles shall be provided to hold the sling.

§21. *Finishing and Cleaning.*—

Rule 210. *How Cleaned.*—Where castings are cleaned or chipped in molding or casting rooms, there should be provided suitable screens, partitions or other effective means to protect employees against flying chips and excessive dust. All castings shall, where practicable, be cleaned or chipped in rooms separated from rooms used for other purposes.

Rule 211. *Finishing Rails or Benches.*—Where finishing rails or benches are used, they must be sufficiently far apart to allow the operators to pass between them without being endangered by falling castings.

Rule 212. *Dry Tumbling Mills.*—In new installations where dry tumbling mills are used within a foundry, exhaust apparatus shall be installed and operated that will effectively draw off the dust created by the operation of such mills; in existing installations such mills may be inclosed in reasonably dust-tight compartments while in operation.

*Factory Lighting Code No. 17 may be obtained from the Engineering Standards Committee, 29 West Thirty-ninth Street, New York.

Tumbling mills, when not inclosed, shall be provided with substantial guards on open sides, when in operation.

Rule 213. *Dry Grinding, Buffing or Polishing Machines.*—Where dry grinding, buffing or polishing machines are used, an exhaust apparatus or its equivalent that will effectively remove the dust created by the operation of such machines shall be installed and operated. This rule shall not apply to floor or bench stands used specially for tool grinding, nor to portable grinders.

Rule 214. *Swing Frame Grinding Machines.*—Where swing frame grinding, buffing or polishing machines are used, screens shall be provided when necessary to protect adjacent workmen.

Rule 215. *Sand Blasting.*—Sand blasting by hand-operated apparatus shall be carried on in suitable sand blast room or outside the foundry, and in both cases effective means shall be provided to protect passers-by from the sand blast. Dust shall not be exhausted into the open air but into a collector.

Rule 216. *Arc Welding.*—A guard or shield shall be provided where necessary to protect other workers from exposure to the radiation from the electric arc, and no employee shall be required to work in such a position that his face is exposed to such radiation from any neighboring source. It is recommended that permanent inclosures be supplied, where practicable, for arc welding and cutting.

Part III. Lighting, Heating and Ventilation

§30. *Lighting.*—

Rule 300. *Lighting.*—The light in every foundry shall be in accordance with the requirements of the Factory Lighting Code.

§31. *Heating.*—

Rule 310. *Working Temperature.*—A comfortable working temperature shall be maintained during working hours in all sections where employees are regularly working.

Rule 311. *Salamanders.*—Salamanders shall not be used except where it is clearly impractical to use some other form of heating device. Where salamanders are used, the coke must not have a sulphur content exceeding 1 per cent.

§32. *Ventilation.*—

Rule 320. *General Requirements.*—The ventilation and ventilating equipment shall be in accordance with the requirements of the Safety Code for Ventilation.

Rule 321. *Removing Smoke, Fumes, etc.*—Where the natural circulation of air is not sufficient to remove smoke, gas fumes or dust injurious to the health of employees, mechanical ventilating apparatus of sufficient capacity to do so shall be installed and operated.

Rule 322. *Drying Ladles.*—Where the operation of drying ladles causes fumes or gases injurious to the health of employees within the foundry, ventilating hoods shall be provided and kept in repair for the purpose of removing effectively such fumes or gases.

Rule 323. *Ovens.*—All ovens from which fumes or gases injurious to the health of employees escape shall be provided with hoods of sufficient capacity to remove effectively such fumes or gases.

Rule 324. *Height of Ceilings.*—No foundry in which zinc-bearing metals are melted or poured shall be operated in a room less than 14 ft. in height from the floor to the lowest point of the ceiling, except that where the roof is of peak, saw-tooth or arch construction, the minimum height of the side walls may be 12 ft. If such foundry is installed in the front part of the building, the ceiling shall be in every part not less than 6 ft. 6 in. above the curb level of the street in front of the building, and if such foundry is installed entirely in the rear part of a building, or extends from the front of a building to its rear, the ceiling shall be not less than 3 ft. above the curb level of the street in front of the building, and the foundry shall open onto a yard or court which shall be not less than 6 in. below the level of the floor.

Part IV. Operating Rules

§40. *Inspection and Maintenance.*—

Rule 400. *Daily Inspection of Equipment.*—All ladles, shanks, crucibles, crucible shanks, crucible tongs, yokes, skimmers, slag hoes, crane chains, cables, ropes and slings used in handling or pouring molten metal shall be inspected daily in regard to their safe condition, by the men preparing and using such appliances.

Rule 401. *Weekly Inspection of Equipment.*—A weekly inspection in regard to the same condition of all crane chains, cables and slings in use for suspending molten metal in mid-air shall be made by a man designated by the employer for that purpose. Written report of such inspection shall be kept.

Rule 402. *Defective Equipment.*—Equipment found upon inspection to be defective shall not be used while in that condition.

Rule 403. *Condition of Tools.*—All tools shall be kept properiy dressed and free from mushroomed heads.

Rule 404. *Riding Chains and Crane Loads.*—The practice of riding chains and crane loads shall be forbidden.

Rule 405. *Swinging or Dangling Crane Chains.*—Swinging or dangling crane chains must clear all obstructions when the crane is in motion, or they must be guided by chainmen walking beneath.

Rule 406. *Removing Crucibles from Furnace.*—When the combined weight of a crucible containing molten metal and the crucible tongs exceeds 100 lb., the crucible shall be removed from the furnace by not less than two men or by mechanical means, and when the combined weight exceeds 300 lb., three or more men or a mechanical device shall be employed.

Rule 407. *Use of Explosives and Drop Balls.*—The use of high explosives or of a drop ball for breaking scrap shall not be permitted unless done under reasonably safe conditions and under expert supervision.

Rule 408. *Locomotives in Foundries.*—No locomotive while discharging smoke shall remain inside a foundry during working hours except during such periods as may be necessary for its entrance and exit; but this regulation shall not apply to locomotive cranes nor steam charging machines.

§41. *Clothing and Protection Worn by Workers.*—

Rule 410. *General Requirements.*—Head and eye protectors shall conform to the requirements of the National Safety Code for the protection of the head and eyes of industrial workers.

Rule 411. *Goggles.*—When the eyes of employees are liable to injury by dust, flying chips or molten metal, such employees shall wear suitable safety goggles which shall be provided by the employer.

Rule 412. *Helmets and Hoods.*—When engaged in sand blasting by hand apparatus, workmen shall wear suitable helmets or hoods which shall be furnished by the employer.

Rule 413. *Protection for Welders.*—When engaged in welding or burning operations by means of an oxy-acetylene or other gas torch, employees shall wear suitable safety goggles which shall be provided by the employer; when engaged in similar operations by means of an electric arc, employees shall use suitable shields or wear suitable helmets, which shall be provided by the employer. In both these operations employees shall wear slow combustion aprons or overalls.

Rule 414. *Respirators.*—When the dust arising from cleaning operations is injurious to the health of the cleaners, they shall wear suitable respirators, which shall be provided by the employers.

Rule 415. *Shoes and Leggings.*—When handling molten metal employees shall wear suitable congress or other approved shoes, which shall be furnished by themselves, and, when necessary, shall

wear suitable leggings to be provided by the employer.

§42. *Qualifications and Duties of Female Workers.*—

Rule 420. *Examination.*—No female shall be employed in a foundry unless upon examination by a physician it has been determined that she is of normal size, health and weight for her age.

Rule 421. *Effort Allowed.*—No female employed in a foundry shall lift any object exceeding 25 lb. in weight unless she uses mechanical means by which her physical effort is limited to 25 lb.

Rule 422. *Handling Hot Cores.*—No female employed in a foundry shall be permitted to handle cores which have a temperature of more than 110 deg. Fahr.

Part V. Safety and Welfare

§50. *Recommendations.*—

Rule 500. *Safety Committees.*—Accident prevention should be encouraged by the formation of safety committees among the men. All foremen should take a personal interest in accident prevention and are expected to set an example of carefulness.

Rule 501. *Enforcement of Regulations.*—Strict enforcement of workshop regulations is one of the best methods of accident prevention.

Rule 502. *Educational Methods.*—Experience has shown that most accidents can be prevented by supplementing mechanical safe-guarding by educational methods; therefore, the use of safety meetings, bulletin boards, motion pictures and suggestion boxes should be encouraged.

Rule 503. *Room for Meals.*—A room should be provided and kept in sanitary condition for employees' use to eat their meals.

Rule 504. *First Aid Kits.*—First aid kits should contain:

1 tourniquet, 1 pair nickel plated scissors, 1 pair nickel plated tweezers, 1 triangular sling, 1 wire gauze splint, 12 assorted safety pins, 2 2-oz. tubes burn ointment, 1 2-oz. bottle castor oil, 1 2-oz. bottle 3 per cent alcoholic iodine, 1 12-oz. bottle white wine vinegar, 1 2-oz. bottle 4 per cent aqueous boric acid, 1 2-oz. bottle aromatic spirits of ammonia, 1 2-oz. bottle Jamaica ginger or substitute, 3 paper drinking cups, 10 applicators, 1 roll absorbent cotton (1.5 oz.), 1 piece flannel 25 x 25 in., 1 10-yard roll 3-in. gauze bandage, 2 5-yard rolls 2-in. gauze bandage, 3 5-yard rolls 1-in. gauze bandage, 1 5-yard spool 1-in. adhesive plaster, 6 sealed packages 6 x 36 in. sterile gauze, 1 teaspoon, 1 aluminum cup, 1 medicine glass, 2 medicine droppers, 6 tongue depressors, 12 first aid record cards; such other equipment as prescribed by the Industrial Sanitation Code.

NON-MAGNETIC CAST IRON

New British Product to Use in Place of Brass or Gun Metal—Properties and Cost

A new kind of cast iron which is non-magnetic has been brought out in England. It is intended to meet the necessity of having a metal similar in non-magnetic properties to brass or gun metal but not so expensive. S. E. D. Dawson, chemist and foundry manager for Ferranti, Ltd., Manchester, conducted a series of experiments which have resulted in the production of the new alloy at the company's Hollinwood works under the Dawson-Ferranti patents.

The metal is distinguished by the name of "No-Mag," and, according to the London *Iron and Coal Trades Review*, is an alloy possessing not only the features of gun metal which are essential in the design and construction of electrical machinery, but also having a higher specific resistance than ordinary cast iron. Its use is intended to eliminate magnetic hysteresis, and to minimize the losses due to eddy currents. The magnetic permeability of ordinary cast iron is 330.00, while for "No-Mag" it is only 1.03, and for brass 1.00; the specific resistance in micro-ohms per cm. cube being 95.0, 140.0, and 7.5 respectively.

It will be obvious that by the use of such a metal in the construction of an alternator the hysteresis and eddy losses in the stator end plates are reduced to a minimum, and magnetic leakage is largely removed. The same applies to the end covers over the end connections. In the case of armatures or rotors of direct or alternating-current generators or motors, by the use of the new metal in the end plates the total flux is kept particularly confined to the armature core, and magnetic leakages are again reduced to a minimum, the latter being important from the point of view of the reduction in the amount of copper which may be used.

The iron can be cast with the same facility as ordinary cast iron, brass, and aluminum, and has the same appearance as the former, with which it also compares equally as regards strength and machining properties. In tensile and transverse strength it follows the usual figures for cast iron, but it has the advantage of increased toughness and malleability, which is observed both in the transverse deflection and in its resistance to shock. The increased toughness as compared with ordinary cast iron is also shown in the Izod test.

The chief characteristics of a non-magnetic cast iron are: (1) Low magnetic permeability; (2) high specific resistance; (3) low resistance temperature-coefficient. "No-Mag" is slightly less permeable with increasing temperatures; at 17 deg. C. the permeability is 1.025, while at 100 deg. C. it decreases to 1.020. This property of low permeability enables the metal to be used in place of brass, especially where there is danger of undesired eddy currents, and its uses in this direction cover a large field. Moreover, the specific resistance of the new metal, showing an increase of 50 per cent over cast iron, suggests the use of this material in cases where increased resistance with smaller volume of metal or similar resistance with extra metal for strength would be an advantage, such as in resistance grids. Further, "No-Mag" has a resistance temperature between 0 deg. C. and 100 deg. C. of 0.0009 per 1 deg. C., as compared with approximately 0.0019 per 1 deg. C. for ordinary cast iron.

The cost of "No-Mag" is, as with other irons, somewhat dependent upon the type of casting, but it may be taken as being 20 per cent to 50 per cent higher in price than gray iron. When compared in price with that of gun metal, however, its advantage as a substitute for that metal is obvious from an economical point of view. Among the applications of "No-Mag" may be mentioned oil-switch covers, bus-bar clamps, brackets, cable boxes, sealing bells, bearing covers, separating pieces, transformer covers, etc.

Unemployment in Germany

WASHINGTON, Jan. 16.—An increase of about 200 per cent in both unemployment and part time work during the last three months in the metal industry of Germany has taken place, according to a report sent to the office of the American commercial attache in Berlin by the Deutscher Metallarbeiter Verband. In September 3125 of the total membership of the German Metal Workers' Union was unemployed as compared with 7706 in October and 9289 in November of last year. The union has a membership of 1,637,484 distributed in and practically controlling 31,454 factories throughout the republic.

In September 10,688 of the membership was working on a part-time basis as compared with 24,250 in October and 31,918 in November. The increasing prevalence in part-time work is shown further by the growing number of plants reducing their working hours by 17 hours or more per week. In September only four factories had reduced the working hours per week and many by 25 hours while in November 22 factories were on a 23-hr. week.

The property of the Springfield Foundry Co., Taylor Street, Springfield, Mass., consisting of land 90 x 100 ft., a two-story foundry and an office for foundry purposes, has been sold to Henry J. Perkins Co., Inc., wholesale fruits. It is the present intention of the new owners to dismantle the foundry.

Disastrous Price Cutting in Great Britain

Control by Associations Hoped For—Steel Industry Suffering from Sharp Competition —Laborers Distressed

WASHINGTON, Jan. 16.—Opinions prevailing in the iron and steel industry in the United States that producers in Great Britain had been able to expand export markets only at the sacrifice of profits appear to be fully confirmed by a report from Assistant Trade Commissioner H. B. Allen Smith, London, to the Department of Commerce, in which he says the British manufacturers are beginning to hope for an early recontrol of market prices by the old associations of producers. He declares that if the wish in this instance gives rise to the thought, 1923 will see price fixing associations again ruling the metal markets in England. He points out that widespread "decontrol" of iron and steel prices, instituted last August to revive trade, seems to be reaching the end of its course. Orders have been brought to the industry since then, partly through that competitive freedom to cut prices closely in the principal districts and partly no doubt because some buyers could defer no longer. Under "decontrol," in fact, Mr. Smith points out, the prices to which iron and steel have steadily descended in the past half year have strained margins in many branches of the trades to absolutely profitless levels. Makers now, even those in the few highly efficient low-cost plants, feel that they cannot quote lower.

Eating Away of Prices

In this connection, Mr. Smith says: "The steel industry cannot afford a further eating away of prices by sharp competitive quoting for orders. This is the present position for two powerful reasons. One has been intimated already; the prices at which orders are now being accepted are in most instances barely profitable or cause loss. Costs of producing are still heavily burdened with taxes, freights, and disproportionate costs of materials, even though substantial relief has been derived from reduction in wages during the year. The most modern plants are getting no dividends out of recent business. Such a small proportion of plant has been put into operation by order placements since 1921 that directors have continued throughout 1922 to question the advisability of partial operation to reduce overhead losses as against complete shutting down of plant until trade gives them both volume and profit again. From this angle, recontrol of prices would stabilize the market and strengthen the newfound buying wave.

"But an even more urgent reason is the second one. Iron and steel workers cannot live on lower wages than they now receive. The sliding-scale basis of wage payment prevails generally in Great Britain. The rates, hourly or weekly, fluctuate up or down from a fixed basis according to the movements of steel prices. The decontrol price cuts in the principal steel products that govern wage changes have not only gone beyond profit margins for the companies; in so doing they have also brought workers' earnings below the subsistence level.

Troubles of Workingmen

"The distress of the laborer is clear from a comparison of the cost-of-living index, which now touches 80 per cent above pre-war, and the average steel wage scale now at about 40 per cent over 1914. With inactivity or part-time work, steadily declining wages, and even a small recent advance of his costs of living, the lot of the average steel worker is far from enviable. Common labor on the northeast coast (Cleveland area) is receiving wage payments of 36 per cent above prewar rates, earning 36s. to 40s. a week. From that his rent takes 7s. to 10s. weekly, so that he tries to feed and clothe his family on £1 10s, or about $7. He can do little more than feed a large family on that amount, when food prices themselves are at least 75 per cent above 1914 charges. On the average, in all British steel plants, for all grades of workers, the weekly pay does not exceed £3 today.

"A return to price control is considered the solution of this predicament. The resulting stabilized market values would, no doubt, crystallize waiting orders and, by employing more of idle plant, advance companies' chances of renewed profit-making; while a stiffening of prices would boost the sliding wage-scale and tend gradually to relieve workers' poverty."

Advantages of a Few Plants

In another report dealing with the advantages of modern steel plants in Great Britain, Mr. Smith says that the precarious nature of the steel trade in 1922 has tended to reveal economic advantages inherent in relatively few British mills.

On this subject Mr. Smith comments as follows:

"A continued paucity of large orders has characterized the market for months. This condition would make keen rival bidding for business among the numerous British firms whose large-scale plant has been wholly or partially idle over long months. But the shading of profits was aggravated by consistent Continental quoting of exchange-favored prices. Up to July, most worth-while business was admittedly being placed, if at all in Britain, at profitless or losing levels. Then came the decisions of price-fixing associations to decontrol the steel markets, in offering further leeway for slashing of quotations, and this decontrol has ruled for the last half of the year.

"Only the best-equipped mills have sustained the competitive strain of business. Some of these are among the only plants that now, as business turns upward again, are producing at nearly full time.

Points a Moral

"One example will indicate the peculiar advantage of these, and will point the moral against small-scale inferiority that marks so many of the British steel works. A visit to the Northeast Coast area at the opening of December gave the opportunity of seeing in operation perhaps the finest steel-plant layout in Great Britain. * * * It is located at the mouth of the River Tees on the North Sea Coast, a complete new stand of spacious bays, with the latest designs of power-operated mechanism, erected since the war on a great strategic stretch of new land. The up-to-date efficiency of its production, and the direct straight-line processing of its operations from scrap yard through furnace bank, cogging and rolling mills, to stock bay and ocean-loading dock mark this Redcar Works of Dorman, Long & Co. as a leader among the very few effective enterprises in this country. The peculiar advantage in low costs, and therefore lower profitable quotations on its output, in comparison with many less efficient mills all around it, have given this works the best of recent orders. Its books show, and its mills are now working full time on, such desirable contracts as that for 75,000 tons of water-flume plate for the Bombay pipe line of India, for the plates of a number of 100-ft. span bridges to the same country, and for the 16,000 tons of plates to make up the huge White Star Line floating dock for Southampton.

"When price control in British steel markets is reinstated, as is now hoped will be accomplished soon, such excellent equipment as the most modern mills contain will get their constant return of larger profit under a steadier trade than their weaker rivals obtain from prices fixed for the least efficient plants in the country."

BOILER PLATE STEEL

Effect of Temperature, Deformation and Rate of Loading on the Tensile Properties

For some time past the Bulletin of the Bureau of Standards has contained references to the study which has been in progress in the metallurgical laboratories of the bureau on the properties of various grades of boiler plate through the range 20 to 465 deg. C. This has been conducted to determine the effects of blue and cold work, variations in rate of loading, elastic overstrain, and subsequent behavior of the overstrained steel with time. The results of this work have been published in Technologic Paper No. 219, which may be obtained from the superintendent of documents, Washington, at 10c. per copy.

The paper describes the special apparatus employed for making high temperature tensile tests and the differences in behavior of the steel which were noted in various temperature ranges. It was found that the proportional limit of the several grades of plates does not decrease with the first rise in temperature but is either maintained at about room temperature value or increases before the final decrease occurs.

The increased strength produced by rolling cold or at blue heat (300 deg. C.) is maintained throughout a considerable temperature range, but these effects may be removed by suitable annealing. High proportional limit exists while tempering cold rolled plate at 300 deg. C. or after cooling to room temperature, an effect which can be used to advantage in the production of cold finished products, such as thin walled seamless steel tubes where bluing after the final cold pass will produce a high elastic ratio.

Some effects of tensional elastic overstrain are also described in detail. Among the tests made are those showing that the proportional limit can be made to approximate the tensile strength by overstraining successively at blue heat with gradually increasing loads. Differences in behavior of overstrained steel upon etching are observed depending upon whether the overload is applied above 465 deg. C. or below blue heat (300 deg. C.). Likewise, the effect of decrease in rate of loading is different in these two temperature ranges, though little variation in tensile properties was observed in tests performed 30 times as fast as normal.

Apparatus for Determining Magnetic Properties of Short Bars

The direct determination of the magnetic properties of small samples with any degree of accuracy is a difficult matter, but the Bureau of Standards has recently developed an apparatus capable of measuring the magnetic properties of such a sample with a satisfactory degree of precision. The method involves the comparison of a sample of the material to be tested, which is in the form of a cylindrical bar 6 mm. in diameter and 10 cm. long, with a reference bar, the apparent magnetic properties of which have been determined through calibration by means of standard bars having accurately known properties. This method is capable of giving results accurate within 5 per cent for most materials. As the accuracy depends, to some extent, upon the degree with which the properties of the test bar agree with those of the standard bar used for the calibration, the range of materials which can be tested with satisfactory accuracy depends upon the range of the properties covered by the series of standard bars. This work will be found described in Scientific Paper No. 448 of the Bureau of Standards, for sale by the superintendent of documents, Washington, at 5c. a copy.

Magnetic Properties of Iron and Steel

WASHINGTON, Jan. 16.—The magnetic properties of iron and steel, like others of their physical properties, are known to vary greatly with the heat treatment to which the material has been subjected and the amount of carbon it contains. In order to measure accurately the effect of differences in heat treatment and carbon content, it is necessary to eliminate the possible effect of impurities. For this purpose a quantity of very pure iron has been prepared at the Bureau of Standards, and from this has been made a series of iron containing 1.6 per cent carbon.

The Bureau has just issued a paper dealing with the effect of heat treatment and carbon content on the magnetic properties, the methods of preparing the alloys and the effect on the strength, etc., having been dealt with in a previous paper. In each case the measurements were made after the material had been subjected to a specified heat treatment, such as hardening, tempering or annealing. The apparatus used was especially designed to accommodate small samples and was capable of applying to them a magnetizing force several times as great as that ordinarily used in tests.

The permeability, or ease with which the specimen could be magnetized, decreased with increase of carbon content. The maximum value of magnetism acquired also decreased with increase of carbon. It was found that certain characteristic magnetic changes correspond closely to known structural transformations of the material resulting from heat treatment. This work is described in Scientific Paper No. 463 of the Bureau of Standards and may be obtained from the superintendent of documents, Government printing office, Washington, at 15c. a copy.

Wear of Steels

Several tests have been conducted to determine the resistance to wear of hardened and tempered chromium steels. It was noticed that while the so-called standard hardened specimen, which was run on the upper shaft of the testing apparatus, invariably had a polished surface at the conclusion of every test, the bottom specimen, especially the tempered specimens, presented a dull appearance which was presumed to be caused by abraded particles sticking to the specimen. It seemed, therefore, that specimens with this dull mottled appearance would show a loss of weight less than the actual loss. To prove this several tests were made of Ketos steel running the standard hardened specimen on the lower shaft and the tempered specimens on the upper shaft. The curve of rate of wear versus tempering temperature obtained was similar to the previous curve but showed a greater rate of wear. The tempered specimens under the last-named conditions were free from abraded material at the end of the tests. Efforts will be made to prevent the adherence of the abraded metal particles to the specimen.

Powdered Coal for Combination Furnaces

On page 1342 of THE IRON AGE of Nov. 23, 1922, in describing the new sheet mill plant of the Ashtabula Steel Co., Ashtabula, Ohio, appeared the following: "It is stated that this is the first plant in which this fuel [powdered coal] is used for firing combination furnaces." Our attention has been called to an article in THE IRON AGE, Dec. 11, 1919, page 1167, giving description of a plant at the Newport Rolling Mills Newport, Ky., in which powdered coal firing was adapted to combination sheet and pair furnaces. This is shown by both text and illustration. The Newport installation, which is still in operation, was first operated in the fall of 1918. The equipment at that plant was furnished by the Quigley Fuel Systems, 26 Cortlandt Street, New York, while that at Ashtabula came from the Fuller Engineering Co., 50 Church Street, New York.

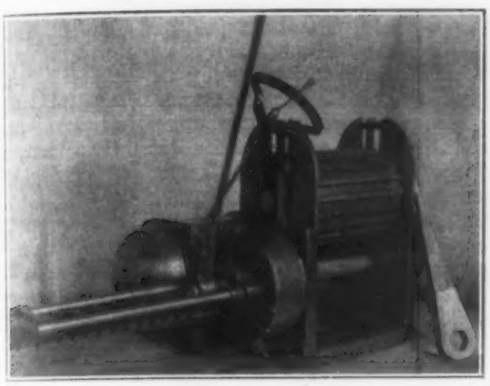
Chart of British Steel Prices

A chart of British iron and steel prices, covering various leading products from 1914 to 1923, has been published by W. Richards & Sons, Ltd., Middlesborough, England. The chart is to be issued each year, about the first of October.

Rotary Scrap Metal Bundling Machine

A machine for bundling scrap metals, designated as the Tempus No. 3, has been brought out by Samuel H. Garrett, 234 North Thirteenth Street, Philadelphia. It is designed to tightly compress into bundles, without shearing, such materials as tangled wire, cotton ties, bushy turnings, soda drums, old tin roofs, bicycles, spring beds, tubing, automobile guards and similar scrap ordinarily troublesome to handle. On this machine low grade stock is said to be reclaimed in bundle form, which may be shipped with the best grades of heavy melting stock.

The main frame of the machine, which is shown in



Machine For Compressing Into Bundles Tangled Wire And Other Scrap Difficult to Handle

the illustration, is of cast iron, rods and shafts are of polished steel and bearings are of ball or anti-friction type. The inside and ends of the housings are accurately planed and the radius on which the bundle is formed is chilled. The housings are fastened to the base, which is planed to receive them and also to accommodate a 5-hp. motor when that type of drive is required. Moving parts are inclosed.

The winding mandrel is driven by a reversing friction movement, through a worm gear. The worm wheel is of manganese bronze and the worm, of hardened steel, runs in oil and is equipped with a ball bearing thrust. Control is by a convenient lever. Rotating disks, mounted on each side of the machine, against which the ends of the bundles are formed, are intended to increase the life of the machine.

A winch head is provided for drawing material to the front of the machine and also for unloading from trucks. This is emphasized as an important feature, as the material when hauled usually arrives in a tangled mass and is otherwise difficult to unload. For making the bundle within 1 in. of the finished size very little power is said to be necessary, full power being used only for a few minutes at the peak, at the time of finishing the bundle.

Combination Drill Table and Vise

A 19-in. combination table and vise for use on 20, 21 and 24-in. drill presses has been added to the line of the Modern Machine Tool Co., Jackson, Mich. Its con-

Combination Table and Vise For Use On 20, 21 and 24-In. Drill Presses

struction, which is similar to the 16-in. vise previously brought out, may be noted from the accompanying illustration.

The device is designed to fit any make of drill press, and when opened provides a table 19 by 29 in. It will permit work to extend below the face of the table to the base of the drill press. The regular table of the machine is removed, and the device fitted into the table socket; it swivels the same as the regular table. When closed the vise forms a table which will turn over three-quarters of a revolution, and when open forms a large, handy vise.

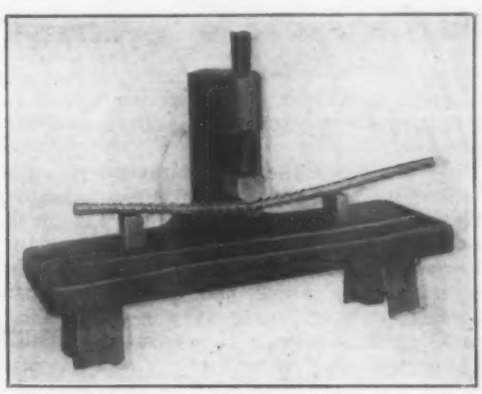
The vise jaws are faced with machine steel and are made interchangeable for easy replacement. Hardened jaws are available if required. The vise screw is 1¼ in. in diameter, four threads to the inch, and runs in a bronze nut. The ways are accurately machined. In installing, no fitting or change is necessary except to turn the shank to fit the socket of the press. The shank is easily detached from the table and placed on a 1¼-in. arbor for turning. The diameter of the table closed, is 19 in. and the jaws open, 10 in. The weight is approximately 200 lb.

Technology of Slate

In an extensive treatise, issued by the Bureau of Mines, Washington, the subject of quarrying and preparation of slate is described in great detail, and with a wealth of illustration, both photographic and diagrammatic. The work is the subject of a thesis by Oliver Bowles. It is furnished with a comprehensive index and bibliography and carries considerable statistical information. The total value of the American output of slate in 1920 is given as $8,726,442, of which about 40 per cent consisted of roofing slate.

New Broaching Tool

From 75 to 300 per cent more operations than the usual broaching tool and ability to take 45 to 50 per cent greater strain are claimed for the new broaching tool, known as the Superbroach, developed by the American Broach & Machine Co., Ann Arbor, Mich. High tensile strength of the tool is emphasized, resulting in minimum need of grinding and the cutting of a smooth clean hole. The illustration shows a round



New Broaching Tool Of High Tensile Strength

broach bent cold without breaking. The new tool is available in round, square, multiple spline and other shapes.

Columbiana Foundry Co. Reorganized

The Columbiana Foundry Co., McKeesport, Pa., has been purchased from the receivers by local capital and has secured a Pennsylvania charter with capital stock of $600,000, all of which has been subscribed. Additional ground has already been purchased with a view to enlargement in the immediate future. Plans provide for doubling the size of the plant to reach a capacity of about 500 tons per month. Over 100 men are now employed. Castings have been manufactured exclusively, but the management will soon add builders' supplies, sewer inlets, coal chutes and like articles. Under the new Columbiana management, Dr. F. Tho Nason is president; J. D. O'Neil, vice-president; Robert C. Painter, secretary-treasurer, and F. B. McConnell, general manager.

Slide Rule for Open-Hearth Calculations

Allowances for Various Kinds of Scrap and Costs of Delays—Both Sides of Rule Used—Chart for Making Similar Computations

BY B. B. RUSSELL, JR.*

IT has become the popular thing to make up special slide rules for a wide variety of industries but, so far as the writer knows, there has never been a slide rule brought out for the open-hearth steel industry. Inasmuch as open-hearth costs vary widely through the economies effected by using cheap materials, the use of a slide rule in proportioning the various materials is a great advantage. By specially graduating a slide rule for a particular plant, taking into account the sizes of the furnaces and the cost of operation per hour, considerable time can be saved over using the usual form of slide rule. By having two equal parts scales, it is possible to add as well as multiply, and in such manner carry a running total as each item of charge is calculated.

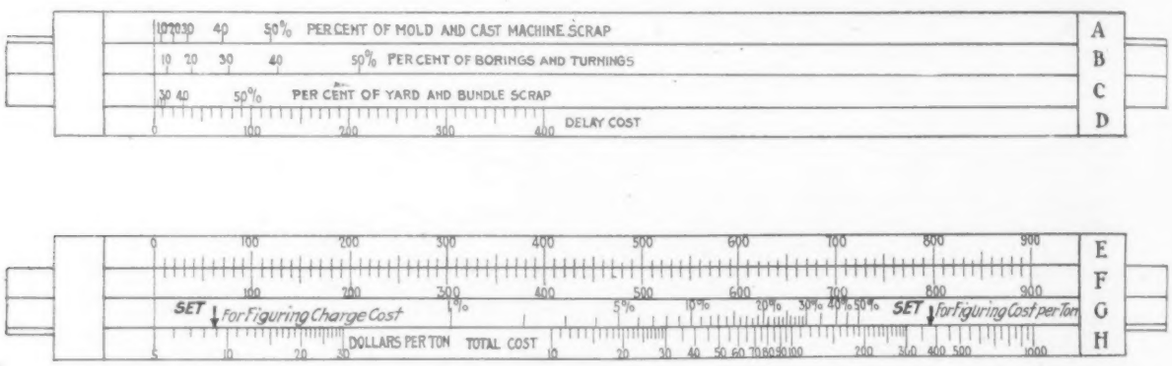
Some materials, while costing less per ton, delay the heat and must have added to them the operating cost for this delay. Unfortunately, the delay is not directly in proportion to the percentage of the material. This complicates the problem. In the delay cost such items as repairs, labor, power and gas were considered. These items would, of course, vary in each plant. Furthermore, certain materials require the addition of extra bottom-making materials.

*C. E. Knoeppel & Co., Industrial Engineers, 52 Vanderbilt Avenue, New York.

The method of graduating such a slide rule follows:

The scales on *H* (Fig. 1) are taken directly from the upper scale on a 5-in. slide rule. Instead of duplicating this scale on *G*, percentages of the total charge are graduated. On the two upper scales, *E* and *F*, are equal parts graduation for adding, so that, while a product is found on *G* and *H*, the running total can be carried on *E* and *F*.

Scales *A*, *B* and *C* are calculated from performance curves of the open-hearth furnaces, plotting time against percentage, delay and materials. The usual time of a heat is found and the delay for varying percentages of the different ingredients. This delay is "costed" and then graduated. The method of using the slide rule is written up as



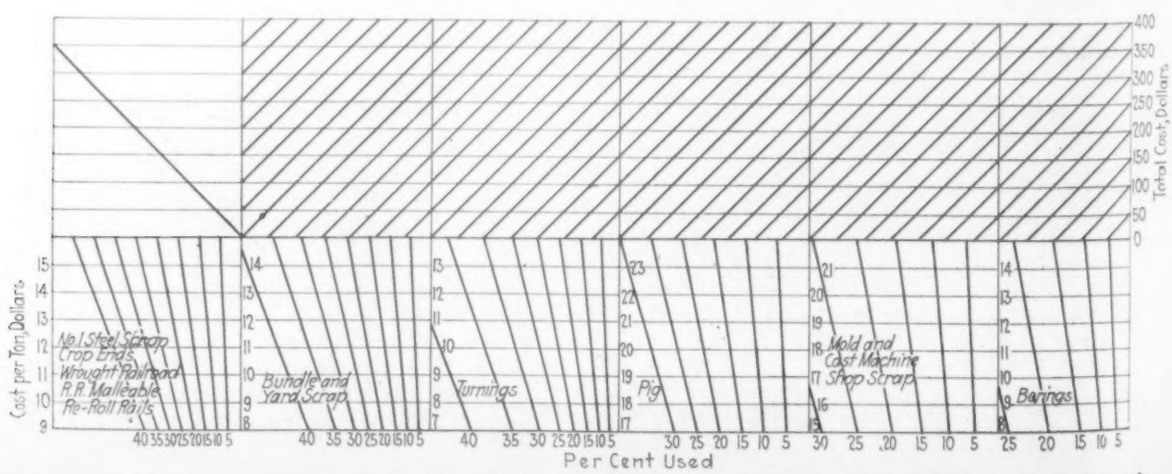
Both Sides of This Slide Rule Are Used in Making the Calculations for Cost of Various Open-Hearth Charges

Standard Practice Instructions

Use.—The open-hearth slide rule has been calculated to give material cost of the charge, working from the percentage of different materials used.

Graduations.—One side of the slide rule (*A-B-C-D*) is used to figure the delay cost due to using materials that require a long period in the furnace, the question of extra labor, gas, furnace repairs and extra bottom material being taken into account. This is the side started upon.

The other side (*E-F-G-H*) is used to figure the cost



Calculations of Cost of Charges Can Be Made by Means of This Chart, the Figures Being Traced Along Horizontal, Vertical and Diagonal Lines in Accordance with a Definite Route of Procedure

of each item and carry the running total. Scales *E* and *F*, being divided into equal divisions, are used for adding, while scales *G* and *H* have logarithmic divisions and consequently multiply and divide.

Operation.—Starting on scales *A-B-C-D*, set the cross line of scale *B* on the total percentage of mold and cast machine scrap used, then set the cross line on *C* on the percentage of borings used and slide the reading slider to the total percentage of yard and bundle scrap used on scale *C*. The sum total cost of the delays is shown directly below on scale *D*. Next, move the cross line on scale *C* up to this point and turn the slide rule over. The reverse rule is now set to take care of the delay cost of operation.

Set the arrow at the left-hand end of scale *G* on the cost per ton of the different ingredients, reading the amount under the percentage used of this ingredient. As an amount is found on scale *H*, the reading slider is moved on scale *F* to the same figure, and the cross line on scale *F* is brought up to the slider. This operation is continued until the 100 per cent is reached and the total cost of the materials and delays caused by using these materials is shown on scale *E*, directly above the last setting of *F*. To reduce this figure to cost per ton, move the slider to the same amount on scale *H*. Set the arrow at the right-hand end of *G* over this point and read the figure appearing under the arrow at the left-hand end of *G*.

Problem

		Per Ton
Pig iron charged	15 per cent	$21
Heavy melting steel	40 per cent	18
Mold scrap	5 per cent	19
Cast machine	10 per cent	16
Borings	10 per cent	12
Bundle scrap	20 per cent	12
Set cross line on *B* on	15 per cent on scale *A*	
Set cross line on *C* on	10 per cent on scale *B*	
Set slider on	20 per cent on scale *C*	
Total cost of delays figure		$36

Set cross line on *C* directly under the slider and turn the rule over. The reading on scale *E* is found to be $36, the same as on the other side, and the rule is set for the metal charges.

Set arrow on left-hand end of scale *G* on $21, read amount under 15 per cent. $170
Set arrow, scale *G*, on $18 on scale *H*, read the amount under 40 per cent..... $310
Continue as before.
The total for the whole problem is... $742

Set $742 on scale *H* with the arrow on *G* over it and read under the arrow at the left-hand end, giving $17 per ton. Add to this the conversion cost per ton, which will give the total cost per ton of the material.

Chart for Figuring Material Cost

The accompanying chart is calculated to give the same information as the slide rule. Prices per ton are shown on the left-hand side of each lower square percentages on the lines. The upper squares are arranged for adding totals found in the lower squares. Delay costs are figured into the positions of the lines.

Method of Operation.—Starting with the cost of heavy melting steel scrap, move horizontally to the percentage line used, then vertically to the 45-deg. line in the upper left-hand square, then horizontally to meet a similar line coming up from the bundle and yard scrap square. When the two lines meet proceed parallel to the lines in the second upper square to the edge of the second square, then horizontally to meet a line coming up from the turnings square, then parallel to the lines again and proceed until the sheet has been crossed.

This chart will give the same results for total cost of materials as the slide rule.

Activity in 31 Bridgeport factories is represented as about 69 per cent of the normal number of employees and nearly 70 per cent of the normal number of man-hours per week. The average hours work per employee is running at slightly more than 49 each week. This is based on a normal of 25,318 employees, or an average of 817 per plant, and on a normal of 49 factory hours per week.

Skin Affections Due to Cutting Oils

An examination of the arms and forearms of 2060 workers whose occupations require contact with one or more of a large variety of cutting oils disclosed that about 27 per cent of these workers were suffering from skin affections characteristic among metal-cutting operatives. A study of the subject was undertaken in response to appeals from many industrial plants, which requested the United States Public Health Service, Washington, to instruct them in available methods for preventing the dermatosis. This public institution has now published a bulletin, No. 770, which is the reprint of an article by William J. McConnell, past assistant surgeon of the service, on "Dermatosis Following the Use of Cutting Oils and Lubricating Compounds."

After a discussion of the various types of oils and compounds used, the characteristics of the skin afflictions and the causes, the report makes the following recommendations:

As a preventive, previous writers on the subject have recommended the frequent cleansing of the hands and forearms with the application of some emollient after the day's work. In the writer's opinion, this routine is equivalent to giving typhoid vaccine after the fever has developed; it is instituting treatment after the injury has been done; it is not preventive. The emollients tend to inhibit further the natural functions of the skin, and at a time when the necessity is not urgent.

Preventive Measures

In those plants where the study was made the practice was instituted of rubbing well into the orifices and crevices of the skin of the hands and forearms a clean preparation of lanolin or a mixture of equal parts of lanolin and castor oil before the work period began. It was noted, however, that while this measure prevented the ingress of the cutting oils and lubricating compounds, it also had a tendency to force further into the orifices the dirt already present on the surfaces. To obviate this difficulty the workmen were instructed to wash the hands and forearms well before applying the lanolin. Warm water and a mixture (in equal parts) of sawdust and liquid soap were supplied. The mixture of sawdust and soap has not only a cleansing action on the skin but also a psychic effect on the men, and they are apt to be more thorough in applying the soaped sawdust to all parts, not merely "hitting the high spots," so to speak. The improvement of the skin lesions from this procedure was so noticeable that the following routine measures were recommended:

1. On entering the plant each workman should wash the hands and forearms thoroughly with warm water, using a sawdust and liquid-soap preparation to assist the cleansing process.
2. After drying skin with individual towel he should apply either lanolin alone or lanolin and castor oil, and rub well into the skin.
3. Foreman should inspect each worker as he enters the workshop, to insure the efficient carrying out of the foregoing instructions.
4. At noon, before eating luncheon, the workmen should wash hands and forearms with warm water and soap.
5. On returning to work they should repeat the morning schedule of washing and applying the lanolin preparation.
6. At the end of the workday they should wash hands and arms with warm water and soap and dry them. No emollients should be applied unless actual abrasions are present, in which event proper dressings should be applied.

The lesions on the thighs can best be prevented by wearing aprons impenetrable to oils.

In plants where this routine was enforced the cases of dermatosis disappeared in a short time, and eight months after the institution of the routine physical examinations of many of the same workers examined in the beginning of this study failed to disclose any new cases of the dermatosis.

On the other hand, in plants where the routine measures had been adopted but not enforced, cases still existed, and the men affected admitted, when questioned, that they had discontinued the measures, or had neglected to use them.

Steel Castings Discussed at Pittsburgh

PITTSBURGH, Jan. 16.—A thorough knowledge of the elements in the charge is essential to success in producing strong castings, E. J. Lowery, metallurgist, Hickman, Williams & Co., told members of the Pittsburgh Foundrymen's Association at its monthly meeting held in the General Forbes Hotel, Monday evening, Jan. 15. He stressed the fact that there is a relation between the elements, one to the other, and discredited the idea that sulphur is a detriment to strength in castings, claiming that those of greatest strength ran as high as 0.10 per cent in sulphur. He said the proper relation between sulphur and manganese is two of the manganese to one of sulphur plus 0.15 and not three to one, the more common estimate. Manganese has a direct relation to the carbon and manganese up to 0.80 per cent has little effect, either upon graphitic carbon or strength.

Touching upon phosphorus in the mix, he said that it is wrong merely to state that this element imparts fluidity; rather its function is to prevent shrinkage in the casting and to keep the metal liquid within confined areas. Carbon is an elusive element about which little is actually known, but its function is to impart strength. It has been developed that 1 per cent of silicon will expel from 1¼ to 1½ per cent of combined carbon. Iron itself is the element about which least is known, the speaker pointed out, adding that good iron is not necessarily the product of the blast furnace.

Mr. Lowery drew attention to wide variation in the silicon content of iron used for the same purpose. Radiator manufacturers use iron of 1.65 per cent silicon in some parts of the country, iron of 1.90 silicon in others, and as high as 2.30 in still other places. Sheet bar roll makers use iron ranging anywhere from 0.65 to 1.05 per cent silicon, and automobile cylinder makers use iron running from 1.65 to 2.87 in silicon, other elements varying similarly.

The carbon factor is a neglected one and its relation to other elements should be studied earnestly. The speaker also touched upon semi-steel castings and the strength imparted by steel in the charge. He illustrated by charts how castings of unusual tensile strength and high Brinell hardness marks had been secured by charging as much as 40 per cent of steel; but such a ratio of steel to the charge could not be maintained daily, and had to be done at intervals.

David McLain, Milwaukee, was a visitor and took a leading part in the discussion, incidentally recounting some of his experiences during a recent trip abroad.

Wages of Sheet Mill and Tin Plate Workers Advanced

YOUNGSTOWN, Jan. 16.—Tonnage rates of sheet mill workers in plants operating under the sliding scale of the Amalgamated Association of Iron, Steel and Tin Workers advance 3 per cent of the base rate, as a result of the bimonthly examination of sales sheets last week.

The average price of Nos. 26, 27 and 28-gage black sheets was disclosed at 3.30c. per lb., as compared with 3.20c. two months before. The examination covered shipments for the 60-day period ending Dec. 31, by mid-Western mills. The price average is the highest since July, 1921.

Under the new rate, affected employees will be paid 34½ per cent above base for the January-February period. Shipments of sheets showed a decline in November-December, as compared with September-October.

The average price of tin plate was disclosed at $4.70 per base box, compared with $4.65, which has been the average for a number of bimonthly periods. The increase of one point entitles tin mill workers to an advance in the tonnage rate of 1 per cent, giving them a rate 23 per cent above the base. Tin plate shipments for the period covered by the settlement registered an increase, as compared with the previous two-month period.

M. F. Tighe, of Pittsburgh, president of the Amalgamated Association of Iron, Steel and Tin Workers, represented employees, while James H. Nutt, of Youngstown, secretary of the Western Sheet and Tin Plate Manufacturers' Association, acted for employers.

Corporation's Unfilled Orders Fall Off

The United States Steel Corporation on Dec. 31, last, had 6,745,703 tons of unfilled business on its books, or 94,539 tons less than on Nov. 30. Thus the corporation began and ended 1922 with a falling off in unfilled tonnage. But it ended 1922 with 2,477,289 tons more of unfilled orders than it had at the close of 1921. The decrease of 94,539 tons in December compares with one of 62,045 tons in November, an increase of 211,680 tons in October, an increase of 741,502 tons in September, an increase of 173,944 tons in August, another of 140,630 tons in July, another of 381,303 tons in June, another of 157,315 tons in May, 602,765 tons in April, and still another increase of 353,079 tons in March, while in February a falling off of 100,609 tons was reported, and a decrease of 26,736 tons in January resulted.

Following is the unfilled tonnage as reported by months since January, 1919:

	1922	1921	1920	1919
Jan. 31.....	4,241,678	7,573,164	9,285,441	6,684,268
Feb. 28.....	4,141,069	6,933,867	9,502,081	6,010,787
Mar. 31.....	4,494,148	6,284,765	9,892,075	5,430,572
Apr. 30.....	5,096,913	5,845,224	10,359,747	4,800,685
May 31.....	5,254,228	5,482,487	10,940,465	4,282,310
June 30.....	5,635,531	5,117,868	10,978,817	4,892,855
July 31.....	5,776,161	4,830,324	11,118,468	5,578,661
Aug. 31.....	5,950,105	4,531,926	10,805,038	6,109,103
Sept. 30.....	6,691,607	4,560,670	10,374,804	6,284,638
Oct. 31.....	6,902,287	4,286,829	9,836,852	6,472,668
Nov. 30.....	6,840,242	4,250,542	9,021,481	7,128,230
Dec. 31.....	6,745,703	4,268,414	8,148,122	8,265,366

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747.

City of Hibbing Presents Claim

The following statement was issued at the office of Chairman Gary, United States Steel Corporation, Tuesday afternoon:

By a previous mutual arrangement the mayor of Hibbing, Minn., Hon. John M. Gannon, accompanied by R. Ray Kreis, a real estate dealer and member of the Council of Hibbing, appeared before the finance committee in behalf of citizens of the old town of Hibbing, with a claim for damages to the property of that town, whose property adjoins a 40-acre tract of land lately bought by the Oliver Iron Mining Co. for the purpose of vacation of streets and alleys on the said 40-acre tract last mentioned, which it is claimed will result if the streets are vacated in a legal proceeding which is pending. The mayor very fully presented the reasons which he urges entitle the claimants to compensation. No arguments were presented on the other side, nor did the finance committee express any opinion or make any promises except that it would take the matter under advisement and after careful investigation and consideration would later make known its conclusions.

Titusville Forge Co. Sold

PITTSBURGH, Jan. 16.—The Titusville Forge Co., Titusville, Pa., a subsidiary of the Penn Seaboard Steel Corporation, has been sold to a group of Titusville and Baltimore interests and will be continued under its present name. J. P. Dillon is chairman of the board. J. P. Dillon, Jr., president, and they, together with B. A. Brennan, Fidelities Security Corporation, Baltimore; James C. Fenhager, Robert Garret & Co., Baltimore, and Vanlear Breck, chairman Fidelity Trust Co., Baltimore, constitute the board of directors. While the company was part of the Penn Seaboard Steel Corporation, the plant was considerably enlarged, and in addition to the old lines of both light and heavy hammered and hydraulic pressed forgings, the company now produces a complete line of rotary and cable drilling tools for the oil fields. J. P. Dillon, Jr., will continue as general manager.

An illustrated lecture on sensitive drilling by Mr. Dowd, sales manager of the Leland Gifford Co., before the machine shop section of the Providence Engineering Society, is scheduled for the evening of Feb. 23 at the society's rooms.

RAILROAD EQUIPMENT BUYING

Contracts for 225 Locomotives and 168 More Pending—Additional Car Negotiations

The Pennsylvania Railroad has authorized the building of 225 locomotives, of which 100 are to be built by the Baldwin Locomotive Works and 125 in the railroad company's own shops at Altoona, Pa. The remaining 75 are still to be awarded.

The Nickel Plate is inquiring for 15 Mikado type, 8 Pacific type and 5 eight-wheel switch engines.

The Central of New Jersey is asking for figures on 6 tank locomotives.

The Southern is inquiring for 6 Mikado type and 3 Pacific type engines for the Mobile & Ohio.

The St. Louis Southwestern is inquiring for 15 consolidation type engines.

The Rock Island Lines are in the market for 30 Mikado type and 10 mountain type engines.

The Nickel Plate is in the market for 500 composite hopper cars.

The Rock Island has placed 500 automobile cars with the Rottenhorf Co., 250 refrigerator cars with the General American Car Co. and 250 flat cars with the American Car & Foundry Co. and is still in the market for 500 box, 500 coal and 250 stock cars.

The Southern Pacific has awarded 575 general service cars with the General American Car Co.

The Universal Portland Cement Co. is inquiring for 300 box cars.

The Atlanta & West Point has placed 150 nopper cars with the American Car & Foundry Co.

The Monon has let 300 steel underframes and superstructures for gondola cars to the Pullman Co.

The Union Pacific is inquiring for 10 horse baggage cars.

The Mobile & Ohio has placed two coaches with the Pullman Co.

The Chicago, New York & Boston Refrigerator Co. is in the market for 100 refrigerator cars.

The New England Oil & Refining Co. has placed 100 tank cars with the American Car & Foundry Co.

The Southern Railway is in the market for 500 box cars, 100 stock cars and 200 hopper cars for its subsidiary road, the Mobile & Ohio.

The National Steel Car Corporation, Hamilton, Ont., reports receiving an order from the Canadian National Railways for 1060 cars, including 1000 box cars, 50 express refrigerator cars and 10 baggage cars. Orders for the raw material will be placed in Canada as far as possible.

REFRACTORIES ACTIVE

Much First Quarter Ordering by Iron and Steel Industry

PITTSBURGH, Jan. 15.—The refractories market has shown considerable activity over the past fortnight in connection with the purchases by the iron and steel industry. Steel companies have been entering their orders for requirements in some cases for the entire year, but as a general rule the business has been for merely the first quarter of this year. The refractories manufacturers seem to be disinclined to commit themselves beyond the first of April because of the uncertainty which exists with regard to the coal situation. The impression is fairly common that the present wage scales will be extended in the coal mines for at least another year and possibly until April 1, 1925. In either event it is figured that there must be further advances in wages to the brick plant workmen. Under the circumstances, refractories producers feel that they cannot enter orders for shipment after April 1, except on the basis of prices in effect at the time of shipment.

As far as is known, such business as has been taken for first quarter delivery is at the prices which recently have prevailed. The market appears to be slightly stronger on silica brick than it was recently, due to the fact that some of those producers who have been shading regular quotations lately have become rather heavily filled up. The market has shown notable activity in chrome brick and one producer reports sales over the past two weeks of 200,000 brick. To some extent activity in this kind of refractories is at the expense of magnesite brick, but since the recent reduction in the latter, the argument of cost has not been so effective in sales of chrome brick. On the basis of orders booked, the industry could run fully 80 or 85 per cent of capacity, but actual operations are not much above 65 per cent because, like so many other industries, there is a decided shortage of common labor.

We quote per 1000 f.o.b. works:

	High Duty	Moderate Duty
Fire Clay:		
Pennsylvania	$43.00 to $46.00	$38.00 to $41.00
Ohio	40.00 to 42.00	35.00 to 38.00
Kentucky	40.00 to 42.00	37.00 to 40.00
Illinois	43.00 to 45.00	40.00 to 42.00
Missouri	48.00	38.00 to 43.00
Ground fire clay, per net ton		5.50 to 8.00
Silica Brick:		
Pennsylvania		42.00
Chicago		47.00
Birmingham		48.00
Ground silica clay, per net ton		7.50 to 9.50
Magnesite Brick:		
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)		65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)		40.00
Chrome Brick:		
Standard size, per net ton		50.00

Present Assembling Costs Per Ton of Pig Iron in Central West and Chicago

Figures recently compiled by an independent iron and steel producer in the Mahoning Valley show that assembling charges on raw materials necessary to produce one ton of pig iron amount to $8.59 where by-product coke is used. Assuming that Connellsville coke is employed, the freights amount to $8.36 per ton of iron. Using as a basis two tons of iron ore, 1.1 tons of by-product coke and one-half ton of limestone per ton of iron produced, the compilation shows the following:

Ore, ¾ direct	3360 lb. at $2.64 per ton	$3.96
Ore, ¼ dock	1120 lb. at 2.89 per ton	1.45
Coke, by-product	2200 lb. at 2.48 per ton	2.73
Limestone	840 lb. at .76 per ton	0.28
Dolomite	280 lb. at 1.39 per ton	0.17
		$8.59

The freight rate on ore includes all freight and handling charges from mine to furnace.

A comparison with the assembling charges per ton of iron for other districts shows Cleveland, $7.39; Pittsburgh, $7.58; Buffalo, $7.12; Johnstown, $7.79, and Chicago, $7.11. In some districts a certain amount of dolomite is used. Any tonnage of dolomite, however, replaces a like amount of limestone in the furnace burden. The figures and comparisons are based upon the assumption that one-fourth of the ore used at interior furnaces is docked at Lake Erie ports. In the compilation, the unloading cost for lake front furnaces is not considered higher than the cost of spotting and unloading cars at interior furnaces.

Assuming that all plants use Connellsville coke, the survey shows the following comparisons in assembling costs, per ton of iron: Cleveland, $6.42; Pittsburgh, $8.36; Buffalo, $7.08; Johnstown, $8.54; Chicago, $8.06, and Youngstown district, $8.36.

Change in Control of Superior Steel Corporation

At a recent meeting of the directors, Superior Steel Corporation, Pittsburgh, E. W. Harrison resigned as president and severed his connection with the company, and James H. Hammond was elected to succeed him. C. H. Forster, formerly vice-president of the company was elected treasurer, succeeding C. D. Claney, resigned. H. F. Devens and Frank R. Frost, formerly active in the company, but who left it more than a year ago, again are affiliated with it and will have joint supervision of sales.

NETHERLANDS PLANT

Blast Furnace Being Erected and Steel Works Will Follow

WASHINGTON, Jan. 16.—Representing the pioneer effort in the Netherlands in this particular field of production, the blast furnace of the Royal Netherlands Iron & Steel Works is in process of construction at Velzen, at the ocean end of the Amsterdam ship canal, says Acting Commercial Attache Howard W. Adams, The Hague. It is expected that the furnace will be completed and ready for operation some time during the present year.

During the war, the report says, the Netherlands was entirely at the mercy of foreign countries for her supplies of iron and steel and the difficulties produced by her dependence on outside sources for her supplies prompted her to take the necessary steps to free herself from this limitation, just as far as it was possible to do so. The company was organized with a capital of 25,000,000 guilders and of this amount the Government subscribed 7,500,000 guilders. The Dutch railroads subscribed fairly heavily and the remainder came from private capital.

The amounts required for the erection of the works greatly exceeded the original estimates and as a result it was decided to limit the program to the construction of the furnace. Arrangements are being made to effect a change of pig iron for rolled products with foreign countries. A contract for the construction of 40 coke ovens was placed with the Evans Coppee, Brussels.

When the entire iron and steel works is completed it is expected to produce all the materials required for the Dutch shipyards and in addition from 20,000 to 30,000 tons of other material annually. It will be necessary to import both the coke and the coal, although the Netherlands hopes later to be able to supply its own coal for this purpose. Iron ore deposits exist in the province east of the Zuyder Zee, but surveys have not shown them to be of any economic value.

The Royal Iron & Steel Co. is a participant in the Netherlands Steel Works, formerly J. M. de Munick Keizer, at Utrecht. This concern completed a new Siemens-Martin furnace and rolling mill last year. This plant is equipped for an annual production of 300,000 tons of steel castings and rolled steel. It was built for the manufacture of both the ordinary and superior grades of steel. So far the only use of the rolling mill has been for the production of bars from imported prerolled blocks.

The Royal Netherlands Iron & Steel Co. is also interested in the Societe Anonyme Carreres de Nameche, a limestone quarry concern of Belgium, and the Phoenix Aktiengesellschaft fuer Bergbau und Huttentrieb, one of the largest concerns of the kind in the Westphalian district of Germany, with a productive capacity of about 1,500,000 tons of steel annually. The Dutch concern is availing itself of the experience of the German concern in the construction of the blast furnace at Velzen.

A great many misgivings are expressed over the possibility of the Netherlands succeeding in iron and steel manufacture. The greatest drawback is declared to be that it will be necessary to rely largely on outside sources for its supply of ore and coal. It means, it is pointed out, a virtual shifting of dependence on the manufactured article to dependence on the raw materials.

Scrap Iron and the French Steel Industry

WASHINGTON, Jan. 16.—The prevailing tendency toward firmer prices of iron and steel in France is expected to continue for some time, according to a report received by the Department of Commerce from Consul Paul H. Cram, Nancy, France. This conclusion is based on the fact that the cost of production is affected either directly or indirectly by increased economic activity, insufficient arrivals of German coke, a growing shortage in stocks of scrap metal and the sharp fall in the value of the franc.

"At the close of the war France was in possession of enormous quantities of old iron," says the report. "In fact the metal required daily from 1914 to 1918 by the belligerent armies together with that extricated from the ruins of thousands of buildings, bridges and factories constituted a seemingly inexhaustible supply. However, as a result of the important shipments of scrap metal to Germany and Great Britain, these supplies are rapidly diminishing. Consequently, the numerous metallurgists who utilize such metal are urging upon the government the necessity of prohibiting the exportation. The importance of these shipments is shown by the following statistics indicating the excess of exports of scrap iron and steel over imports in the prewar and post-war periods:

Year	Excess of Exports in Metric Tons
1911	74,360
1912	142,200
1913	170,350
1921	522,651
1922 (first 9 months)	694,777

"The demand in France for scrap metal is much greater at the present time than prior to the war. These conditions may be ascribed to two reasons: First, by the cession of Alsace-Lorraine, France acquired a large number of metallurgical establishments, some of which utilize considerable quantities of scrap metal. The importance of the demand may be inferred from the fact that a certain company at Thionville uses 600 tons of scrap metal daily. Secondly, it should be noted that prior to the war scrap metal was utilized only by the manufacturers of open-hearth steel; whereas at the present time large quantities are employed by the blast furnaces inasmuch as scrap metal requires less coke than iron ore for transformation into castings. As a result of this broad demand, prices of scrap metal have more than doubled in the last eighteen months."

British Pig Iron and Steel Output for December and Last Year

LONDON, ENGLAND, Jan. 16 (*By Cable*).—The production of pig iron in Great Britain in December was 533,700 gross tons and that of steel ingots and castings 546,100 tons. These compare with 493,900 tons of pig iron and 600,800 tons of steel ingots and castings in November.

The pig iron and steel output for Great Britain by months and for the year has been as follows in gross tons:

1922	Pig-Iron	Steel Ingots and Castings
January	288,000	327,500
February	300,100	418,800
March	389,800	549,400
April	394,300	404,200
May	407,900	462,300
June	369,200	400,200
July	399,100	473,100
July	411,700	520,800
September	430,300	555,900
October	481,500	565,200
November	493,900	600,800
December	533,700	546,100
Total	4,899,500	5,831,900

The 1922 output of pig iron of 4,899,500 tons compares with 2,616,300 tons in 1921, with 8,034,700 tons in 1920 and with 10,260,315 tons in 1913.

The steel ingot and castings production last year of 5,831,900 tons compares with 3,073,400 tons in 1921, with 9,067,300 tons in 1922 and with 7,663,876 tons in 1913.

Indefinite suspension of the plant at Sharon, Pa., of the Westinghouse Electric & Mfg. Co., recently acquired from the Savage Arms Corporation, is indicated in a statement by E. M. Herr, president of the Westinghouse company at Pittsburgh. The plant is now engaged in production of automobile frames and will be closed as soon as present orders are worked off. It employs about 200 men.

DECEMBER STEEL OUTPUT

Ingot Production Rate About 39,522,000 Tons Per Year—Output Last Year, 33,150,000 Tons

According to the steel ingot statistics, as collected by the American Iron and Steel Institute, the 30 companies which in 1921 made 87.50 per cent of the total, had an output in December of 2,779,890 gross tons. This compares with 2,889,297 tons in November and is a decrease of 109,407 tons. The increase in November over October was 16,882 tons.

On the assumption that companies reporting are supplying the same percentage of the total as they did last year, the output for the 25 working days of December was about 3,177,028 tons or 127,081 tons per day. The November production on the same basis was about 3,302,000 tons or approximately 127,000 tons per day. The December output was at the rate of about 39,522,000 tons per year.

The statistics of the American Iron and Steel Institute since January, 1921, follow in gross tons:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 87.50 Per Cent of the Steel Ingot Production in 1921

Months	Open-Hearth	Bessemer	All Other	Total
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
December	1,129,174	296,380	1,539	1,427,093
Total—Whole yr.	13,125,578	3,679,682	21,686	16,826,946
January, 1922	1,260,809	331,851	822	1,593,482
February	1,395,835	348,571	616	1,745,022
March	1,918,570	451,386	795	2,370,751
April	1,997,465	445,939	1,109	2,444,513
May	2,214,774	494,893	1,474	2,711,141
June	2,143,708	487,851	2,918	2,634,477
July	2,020,572	464,047	2,485	2,487,104
August	1,807,310	404,379	2,893	2,214,582
September	1,911,147	460,127	2,505	2,373,779
October	2,352,207	518,010	2,198	2,872,415
November	2,360,903	525,945	2,449	2,889,297
December	2,241,104	536,214	2,572	2,779,890
Total—Whole yr.	23,624,404	5,469,213	22,836	29,116,453

The December daily estimated output of 127,081 tons compares with the year's low figure of 70,020 tons per day in January.

In making an estimate of the total steel ingot production for 1922 it is to be considered how much of the output last year was made by the non-reporting companies which in 1921 made 12.5 per cent of the whole. The Steel Corporation made a larger percentage of the total in 1921 than in 1922, since it carried over a large amount of business from 1920, whereas the independent companies carried over little. The inference is that the companies which do not make monthly reports but do give annual statistics made a larger percentage of the total in 1922 than in 1921. If we say that they made 13 per cent of last year's output, then the figure above is 87 per cent and not 87.5 per cent of the 1922 total. On that supposition the total for the country was 33,474,000 tons. Assuming that the total above was but 86.5 per cent of the country's output, then the ingot production in 1922 was 33,660,000 tons.

Output of Copper Increases in 1922

The smelter production of copper in 1922, according to the U. S. Geological Survey, as compiled from reports of the smelters covering the actual production for 11 months and the estimated production in December, was about 981,000,000 lb., an increase of 475,000,000 lb. over 1921. The smelter production of copper for December, as estimated by the producing companies, was 103,300,000 lb., or at the rate of about 1,240,000,000 lb. a year.

The total production of new refined copper from domestic sources, determined in the same manner as the smelter production, was about 897,000,000 lb., or 288,000,000 lb. more than in 1921. The refinery production of new copper obtained from domestic and foreign sources, including the imports of refined copper, was about 1,398,000,000 lb. In addition to the output of new refined copper, about 112,000,000 lb. of secondary copper was produced at the refineries, making the total output of the refineries about 1,510,000,000 lb.

Although the new tariff act placed no duty on copper, it affected the records of the Department of Commerce, in which a line of division was drawn on Sept. 21, when the new tariff became effective. Up to that date the total imports of copper in ore, concentrates, matte, blister and refined copper amounted to 363,443,226 lb., of which 75,556,317 lb. was refined copper and 192,050,397 lb. was blister copper. The exports for the first 10 months amounted to 634,501,851 lb. The figures for later imports will not be available until Jan. 15, 1923, but those for later exports will be available somewhat sooner.

The stocks of refined copper in the hands of domestic refineries on Dec. 31, 1922, as estimated by the refining companies, were about 277,000,000 lb., compared with 459,000,000 lb. on Dec. 31, 1921. The stocks of blister copper and material in process of refining, in the hands of the smelters, in transit to refineries, and at refineries, on Dec. 31, 1922, were estimated by refining and smelting companies at about 352,000,000 lb., compared with 283,000,000 lb. on Dec. 31, 1921.

The quantity of primary refined copper withdrawn on domestic account during the year was about 882,000,000 lb., as compared with 611,000,000 lb. in 1921.

United States By-Product Coke Output

Supplementing the data given on pages 62 and 63, Jan. 4, the table below shows the rapid growth of the use of the by-product oven in the United States. From an inconsiderable start in 1893, by-product coke reached one-fifth of the total coke output in 1911, one-third in 1915, one-half in 1919, since which date it has rapidly shoved bee-hive coke aside until today by-product coke represents nearly 79 per cent of the total.

Coke Produced in the United States, 1880 to 1922 (Partly from "Mineral Resources of the United States")

Year	By-Product Coke Quantity (Net Tons)	Beehive Coke Quantity (Net Tons)	Quantity (Net Tons)
1880	.....	3,338,300	3,338,300
1885	.....	5,106,696	5,106,696
1890	.....	11,508,021	11,508,021
1893	12,850	9,464,730	9,477,580
1900	1,075,727	19,457,621	20,533,348
1905	3,462,348	28,768,781	32,231,129
1910	7,138,734	34,570,076	41,708,810
1911	7,847,845	27,703,644	35,551,489
1912	11,115,164	32,868,435	43,983,599
1913	12,714,700	33,584,830	46,299,530
1914	11,219,943	23,335,971	34,555,914
1915	14,072,895	27,508,255	41,581,150
1916	19,069,000	35,464,000	54,533,000
1917	22,439,280	33,167,548	55,606,828
1918	25,997,580	30,480,605	56,478,185
1919	25,143,542	19,650,000	44,793,542
1920	30,833,951	20,511,000	51,344,951
1921	19,750,000	5,561,000	25,311,000
*1922	28,000,000	†7,489,000	35,489,000

*Estimated.
†11 months.

Austria's Steel and Iron Output

The production of pig iron in Austria, according to *Stahl und Eisen*, in the third quarter of 1922, was 84,000 metric tons as compared with 160,000 tons for the first half. The steel output for the third quarter was 123,000 tons, which contrasts with 241,000 tons for the first half of last year.

Through the traffic bureau of the Youngstown Chamber of Commerce, H. D. Rhodehouse manager, iron and steel properties in the Mahoning Valley will secure the benefits of a reduction in freight rates on flux stone and dolomite. The tariff on flux stone from Martinsburg, W. Va., to the Valley, has been cut 38c. per ton, while reductions have been made in the tariff on roasted dolomite from Pennsylvania, West Virginia and points in Ohio. Joint benefit of these two freight reductions to open hearth furnace operators in the Youngstown district is estimated at $100,000 yearly.

British Iron and Steel Market

Steel Prices Harder—Exports for December and Year—Tin Plate Firm and Advance in Sheet Bar Is Anticipated

(By Cable)

LONDON, ENGLAND, Jan. 16.

Pig iron is firm on sustained demand from home consumers. Foundry grades are scarce, but there is little inclination to increase output, owing to high costs of production. Export buying is poor. America is inquiring for Scotch foundry iron, but at unworkable prices.

Demand for hematite is expanding and makers are sold out for first quarter's delivery. Prices are firm.

Steel prices generally are harder, on increasing demands and costs. Fair home orders for shipbuilding, constructional and engineering materials have been placed. India is buying substantially of rounds and sections. Small sizes are scarce.

Continental markets are so disorganized that quotations really are nominal. Some merchant business is being done with India.

Tin plate is firm in anticipation of higher values (prices) for tin plate bars (sheet bar) and an expected increase in the minimum base rate shortly. There is a good all around demand and orders for 250,000 boxes of oil plates have been placed in Wales at 20s. ($4.66) basis.

Galvanized sheets are firm on increasing demand. Makers are well sold up.

The Far East is buying black sheets to both thick and thin specifications. India is buying Continental material.

December British exports of pig iron (including ferroalloys) were 87,122 tons, of which 59,699 tons were consigned to the United States. Total iron and steel exports in December amounted to 340,823 tons. The year's exports of pig iron (including ferroalloys) totaled 793,916 tons, of which 378,318 tons were sent to the United States. Total iron and steel exports for the year were 3,401,115 tons.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.66 per £1, as follows:

Durham coke, delivered	£1	11s.			$7.22	
Cleveland No. 1 foundry	4	16½			22.48	
Cleveland No. 3 foundry	4	12½			21.55	
Cleveland No. 4 foundry	4	7½			20.39	
Cleveland No. 4 forge	4	2½			19.22	
Cleveland basic	4	0			18.64	
East Coast mixed	4	13½			21.79	
Ferromanganese	15	0			69.90	
Ferromanganese*	14	0			65.24	
Rails, 60 lb. and up	8	0	to £8	5s.	37.28 to	$38.45
Billets	7	0	to 7	5	32.62 to	33.79
Sheet and tin plate bars, Welsh	7	0	to 7	13¾	32.62 to	35.82
Tin plates, base box	1	0½	to 1	1	4.78 to	4.89
					C. per Lb.	
Ship plates	8	12½	to 9	0	1.79 to	1.87
Boiler plates	11	0	to 11	10	2.29 to	2.39
Tees	9	2½	to 9	10	1.90 to	1.98
Channels	8	7½	to 8	15	1.74 to	1.82
Beams	8	5	to 8	10	1.72 to	1.77
Round bars, ¾ to 3 in.	9	5	to 9	15	1.92 to	2.03
Galvanized sheets, 24 g.	18	0	to 18	5	3.74 to	3.80
Black sheets, 24 gage	11	15			2.44	
Black sheets, Japanese specifications	15	5			3.17	
Steel hoops	11	0	& 11	10*	2.29 &	2.39*
Cold rolled steel strip, 20 g.	22	2½			4.60	
Cotton ties, Indian specifications	15	0			3.12	

*Export price.

Continental Prices, All F. O. B. Channel Ports, Delivery as Specified

No. 3 foundry pig iron:						
Belgium, Feb., Mar.	£4	2½s.	to £4	5s.	$19.22 to	$19.81
Luxemb'g, Feb., Mar.	4	2½	to 4	5	19.22 to	19.81
France, Feb., Mar.	4	2½	to 4	5	19.22 to	19.81
Billets:						
Belgium, not quoted.						
France, not quoted.						
Luxemburg, not quoted.						
Wire rods, 5 mm. (0.2 in.):						
Belgium	£7	5s.	to £10		7½s. $33.79 to	$43.25
Wire nails (keg basis):						
Germany	0	14½			3.38	
Belgium	0	20½			4.78	
Angles:					C. per Lb.	
Belgium	7	7½			1.54	
Tees:						
Belgium	8	5			1.72	
Merchant bars:						
Belgium, Mar., Apr.	6	15			1.40	
Luxemb'g, Mar., Apr.	7	0			1.46	
France, Mar., Apr.	7	0			1.46	
Germany, Mar., Apr.	7	0			1.46	
Joists (beams):						
France, not quoted.						
Belgium, Feb., Mar.	6	2½ upward			1.25	
Luxemb'g, Feb., Mar.	6	2½ upward			1.25	
Germany, not quoted.						
Channels:						
Belgium	7	10	to 7	12½	1.56 to	1.59
⅜-in. plates:						
Germany, Mar., Apr.	8	0			1.66	
Belgium, Feb., Mar.	6	15			1.40	
Luxemburg, not quoted.						
France, not quoted.						
No. 8 gage wire:						
Belgium	14	10⅝			3.02	

Coal Exports and Output Heavy—Building Costs Lower—Prices Firm

LONDON, ENGLAND, Dec. 28.—The intervention of the Christmas holidays and the near approach of the New Year holiday, have caused business in iron and steel to be somewhat dislocated, but when work is resumed it will be done with confidence that a great improvement will be seen throughout the year. Certainly iron and steel works at the present time are better off for orders than they have been since the commencement of the slump of 1921 and the uncertainties, both as regards prices and deliveries of continental material, are causing foreign buyers to turn their attention again to British manufacturers.

It seems evident that prices have more or less reached the bottom, unless there is an enormous drop in the cost of production. At any rate, there are no signs of weakness in values; on the other hand, some of the steel works, which have all along been granting concessions in order to keep their plants going, are showing inclination to ask more money. The cessation of the American demand for pig iron has caused conditions in this branch to be somewhat quieter, but now that the orders for the two new battleships have been placed, and new shipbuilding in general is increasing, the home demand for foundry grades of pig iron is expanding noticeably, and already arrangements have been made for more furnaces to be started as soon as the holidays are finished. In the meantime, sellers of Cleveland No. 3 G.M.B. held firmly to 91s., and East Coast hematite to 93s. to 93s. 6d.

Export business in fuel has been increasing considerably and it is encouraging to note that Welsh exporters have recently secured a contract for America for 50,000 tons of Welsh coal, shipments to be made covering the first quarter of next year. The price has not been disclosed, but it is stated that the fuel is intended for the market in New England, where Welsh coal is able to compete. The production of coal in this country goes steadily on, and for the week ended Dec. 16, reached 5,738,400 tons, which is a new high record for recent times.

Mine owners in the Cleveland district have been approaching the Miners' Association with a view to increasing the hours of work, and granting in return certain advances in the basis rate of wages, but the men are opposing this and at a meeting in Middlesborough, held recently, the feeling was very strong against any increase in the working hours.

In passing, it is interesting to note that the costs of production in certain other industries, in which the iron and steel trades are to a certain extent allied, have been falling somewhat heavily, particularly in the building trade. Under one of the provincial housing schemes, tenders for certain small houses were accepted recently at £302, and at £340 each, whereas six months ago nearly £600 each was being asked.

EXPORT MARKET QUIET

Slight Revival of Japanese Merchant Buying and Some Rail Inquiries—Foreign Pig Iron High

NEW YORK, Jan. 16.—While the situation in export trade is practically unchanged with most markets, Japan, not counting a certain amount of government and municipal buying which continues, is beginning to show signs of revival in merchant buying. One Japanese house in New York reports that during the past few weeks, it has purchased for shipment to Japan on various small orders a total of about 250 tons of black sheets, the first buying of this kind in many months. Another exporter reports some small orders for black sheets and there is an inquiry current asking for prices on about 500 tons of tin mill black plate, 10 sheets to the bundle, and between 1000 and 2000 boxes of tin plate for stock. The total of this merchant activity is, however, still small.

Purchases of rails continue and two small inquiries recently appeared. One of these is for about 20 miles of 100-lb. rails (3150 gross tons) for the Nanki Railway Co., and another, bids on which were opened Jan. 11, called for about 850 tons and accessories, of grooved and T rails for the Yokohama Electric Railway. Specifications included 9 miles of 72-lb. high T rails, 2 miles of 91-lb. high T rails and 2½ miles of 102-lb. grooved rails.

Pig Iron Import Market

Importers of foreign pig iron report quietness and an upward trend in the price of Scotch iron. An upward movement is also being felt in Continental iron, which is not affected by the fluctuation of exchange, as quotations are made by the producers in the pound sterling or dollars. Scotch foundry No. 3 now ranges from £5 12s. 6d. to £5 16s. 3d. per ton, f.o.b. steamship, Glasgow. One importer of Scotch iron in New York states that about the best quotation he can make at present prices is $29.25 to $29.75 per ton, c.i.f. New York, duty paid.

The present political situation in Europe will doubtless stand as an obstacle to importation of German aluminum for some time. The United Aluminum Co. of Germany, which produces a large percentage of the German product, has not been able to supply the domestic demand for some time and there have been imports of Swiss aluminum. According to one seller of German aluminum in the United States, the Erftwerk of Cologne, one of the two large plants of the German corporation has been operating for some time at considerably below capacity, because of fuel shortage, and because of its location may experience further curtailment. The other large plant of the corporation is the Lautawerk in Brandenburg, which is operating at about capacity.

Foreign Engineering Projects

A contract has been entered into by the government of the State of Chihuahua, Mexico, with the Compania Agricola y de Fuerza Electrica del Rio Conchos, S. A., granting the company a concession to extend the power lines from its present hydroelectric plant at Boquilla to Chihuahua and the nearby smelter and mining camps. High-tension lines will be constructed approximately 90 miles long and the entire work, including transmission towers, relay stations, transformers, etc., will cost, it is stated, about $700,000 (United States currency). The Boquilla hydroelectric plant, which is reported to be potentially the second largest in the world, is Canadian owned.

The Irish Power Syndicate, Ltd., 28 Molesworth Street, Dublin, has taken steps to acquire sites for power stations and right of way for transmission lines, according to reports received by the Bureau of Foreign and Domestic Commerce. The total effective horsepower of the Liffey River is estimated at 8300 and the company plans to establish two generating stations, one at Bishopsland and another at Downing's North, County Kildare, about 25 miles southwest of Dublin, for the purpose of supplying that city with electric power.

The Indian Government has decided to advertise all tenders for equipment of Indian railroads and other public works in periodicals with a wide general circulation, and to make the *Indian Trade Journal*, a weekly publication of Calcutta, the official medium for advertising all such notices. Government departments have been invited to furnish the official publication with specifications of all tenders exceeding 5000 rupees.

FRENCH PRICES STRONG

Shortage of Material and High Cost of Fuel Held Prices Up in Late December—Sheet Demand

PARIS, FRANCE, Dec. 28.—Available supplies of foundry iron are becoming scarcer for January delivery. Chill-cast foundry iron, No. 3 P.L., is still being dealt in, for delivery in the first quarter at 250 to 260 fr. at furnaces in the East; but as most of the contracts now being made are at prices sliding with the price of coke it is probable that when delivery comes higher prices will be charged. The export price, f.o.b. Antwerp, is 290 to 300 fr. (Belgian currency).

There is not much change in the hematite iron market. As in foundry iron, the demand is rather slow. Present prices at furnaces are as follows:

	Fr.
East	300 to 320
North	325 to 345
Center (Lyons)	310 to 330

Semi-Finished Material.—As many steel works having lately kept the largest part of their production of semi-finished products, these have become exceedingly scarce. There is an active demand for export, notably from Great Britain. Present prices are variable, according to supplies, but the following average limits may be quoted for basic steel, at producing works in Lorraine or in the East:

	Fr.
Ingots	320 to 325
Blooms	335 to 345
Billets	370 to 385
Sheet billets	395 to 400

Rails and Beams.—The attention of the market is absorbed by the dissolution of the Comptoir Sidérurgique. Consumers of beams are uneasy, apprehending a rise in the price in consequence of the abolition of the comptoir. On the other hand, it is probable that rails will be slightly decreased in price. The Etablissements de Wendel will shortly start making beams in its works at Jœuf.

Sheets and Plates.—This market continues to enjoy favorable conditions, and the Comptoir des Tôles says it has so far received this month 15 per cent more orders than in November. Orders for light sheets exceed the capacity of production. Ship yards have recently placed some orders for plates.

Opportunities in Italy

That the resources of Italy are far from being fully developed and that there are many opportunities for American capital, machinery and technical organizations to be usefully applied were views expressed by Prince Gelasio Gaetani, the new Italian Ambassador to the United States, in an address at the annual dinner of the American Engineering Council held in Washington, Jan. 11.

The development of the electric industry in Italy was outlined and extensive new construction projects mentioned. On these, Prince Gaetani said in part:

"The electric industry in our country has made rapid strides and as to percentage of utilized water power, Italy ranks, I believe, foremost in the world. Electricity is our "white coal" and at the present day its use results in an economy of about two billion lire, otherwise necessarily spent on fuel imports. In 1898 the electric energy developed in Italy amounted only to

87,000 kw.; it increased to 426,000 in 1908, to 1,240,000 in 1918, and power plants for some other 1,000,000 kw. are planned or under construction. About 800,000 kw. are still to be developed.

"On the Tirso in Sardegna, a reservoir of 416,000,000 cubic meters capacity is being constructed. It will be the second largest in the world, ranging immediately after the Assuan dam."

Specialization of Italian labor will bring great advantages to the large engineering and industrial enterprises which are still to be achieved in the United States, he said.

BELGIAN MARKET HALTING

Uncertain Fuel Outlook in Early January Lent Strength to Prices

BRUSSELS, BELGIUM, Jan. 4.—The tendency in the Belgian iron and steel trade is very uncertain. Works generally have orders for two or three months to come and are therefore in no great hurry for taking new ones.

Pig Iron.—The number of Belgian furnaces now in blast is 34. One is to be started today at the Châtelineau works and another one shortly. Prices are still rising, especially for basic pig-iron. They are, delivered in Belgium or f.o.b., Antwerp:

Foundry pig iron No. 3	300 to 310 fr.
Basic pig iron	285 fr.
Hematite pig iron	370 to 380 fr.

Semi-Finished Material.—Available supplies are scarce and prices are rising. Rolling mills not affiliated to steelworks are experiencing difficulty in procuring semi-finished material, billets especially. Although some rather large shipments of billets are still going to Great Britain, semi-products are offered sparingly f.o.b. Antwerp, Lorraine producers quoting high prices. Present prices, f.o.b. Antwerp, for basic steel, are:

Ingots	335 to 340 fr.
Blooms	370 to 375 fr.
Billets	385 to 390 fr.
Sheet billets	400 to 410 fr.

Rolled Products.—The market, influenced by the present inactivity of business and by the uncertainty of future prices, due to the rise of raw products and the scarcity of coke, is showing much hesitancy. Joists are quoted 390 to 410 fr., delivered in Belgium, and 385 to 400 fr. f.o.b., Antwerp. Bars are weaker at 455 to 460 fr. and also 470 to 475 fr., delivered; but for export, the price f.o.b., Antwerp, is hardly 450 to 455 fr. Rods are quoted at 565 to 575 fr., both inland and for export. Small angles, 450 to 455 fr. inland and 435 to 440 fr., f.o.b. Antwerp.

Sheets and Plates.—Notwithstanding rebates conceded by certain producers, heavy sheets remain neglected. Medium sheets have perhaps slightly weakened, but prices are on the whole upheld. Light sheets are very firm. Prices quoted are as follows, f.o.b. Antwerp:

Sheets (basic), 4 mm. and over	455 to 480 fr.
Sheets (basic), 2 to 3 mm.	500 to 550 fr.
Sheets (basic), 1 to 1.8 mm.	570 to 870 fr.
Sheets (basic), 0.5 mm.	950 to 975 fr.

JAPANESE MARKET WEAK

Iron and Steel Prices Decline—Government Stock a Factor—Copper Firm

TOKIO, JAPAN, Dec. 10.—The pig iron trade is suffering from a relapse and is harassed by increased importations, which are underselling domestic offerings. Indian iron is offered here at 51 to 55 yen per ton. The Manchurian product is offered slightly cheaper. No. 1 Japanese grade is priced at 67 yen, while American pig iron cannot be secured for less than 72 yen.

Despondency is the ruling note in steel circles as trade continues to fade. The usual brisk pre-winter business has not been forthcoming, due largely to the cramped financial situation among consumers. Usually a lively trade with the northern districts sets in at this time, in order that deliveries can be made while traffic is open, but as orders are continually growing scarcer, prices are declining and the market is weak.

German importation, which is striving to obtain a foothold, is also a serious factor. A shipment of steel shapes is due the first of the year, and there are rumors of other orders. In addition, the Government works is about to dump holdings of about 90,000 tons, including 30,000 tons of commercial shapes, on the market. Under such conditions, domestic mills are suffering financially, and the year end may force them into serious difficulties.

The market has been weak for several months. Quotations are as follows in yen per metric ton:

	Nov. 25	Dec. 8
Round bars	4.50	4.60
Flat bars	4.50	4.70
Square bars	4.50	4.70
Plates	4.20	4.20
Sheets	6.80	7.00

Negotiations for the export of electrolytic copper to China have long since ceased entirely, but lately there has been an inquiry from Darien for 200 tons. The export price is said to be about 40 yen, c.i.f. Darien, and therefore only goods in bonded warehouses can be shipped, as the market price is now 43 yen or more.

Importation of electrolytic copper has entirely ceased, and the stocks are decreasing slowly. For some time the Sumitomo Copper Mfg. Co. increased its output, but lately it has been forced to curtail operations. With the decrease of supply, consumption tends to increase, with the result that the copper market shows signs of improvement. According to investigations, the supply and demand of electrolytic copper were as follows in October: Output, 4710 tons; in stock, 8890 tons; consumption, 6230 tons.

Copper has been rather firm through the strong attitude of the main producers toward the market, which is now clear of all stocks except the normal few thousand tons in the hands of producers. Although a small supply of imported copper is still continuing from the bonded warehouses, it does not greatly influence the copper market, because there is no arrival of new stocks to replenish the stocks. The recovery appears slow but it has been steady, and justifies hope of further improvement. From 44 to 44.25 yen per 100 kin in Osaka compares favorably with the figures of some weeks ago.

Of the bids submitted on a tonnage of copper for the Osaka Government Arsenal, the figure of the lowest bidder was yen 42.238, but it is rumored the bid was made without stock in hand. It is stated that the speculator who bid is in difficulties because the holders of stock under the present circumstances will not sell for less than 43.25 yen per 100 kin. The producers are firm, and they are not coming down below 44 yen.

Favors Retaining Naval Ordnance Plant at Charleston

WASHINGTON, Jan. 16.—The naval ordnance plant at South Charleston, W. Va., already inoperative, should be retained for the reason that commercial firms having facilities for the manufacture of heavy armor cannot be expected to keep such plants ready for production, now that armored ship construction is at a standstill, and this plant will in a short time probably be the only one in the United States capable of making heavy armor.

This is the suggestion made by a board to consider and make recommendations concerning the shore establishment of the Navy. Rear Admiral Hugh Rodman was a member of the board. The report to the Secretary of the Navy has just been made public. The board also recommends that the naval ordnance plant, Baldwin, L. I., should be abandoned, its activities to be moved to the powder factory, Indian Head, Md.

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January 18, 1923

ESTABLISHED 1855

THE IRON AGE

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C. S. BAUR, *General Advertising Manager*

Member of the Audit Bureau of Circulations and of Associated Business Papers, Inc.

Published every Thursday by the IRON AGE PUBLISHING CO., 239 West 39th Street, New York

F. J. Frank, *President* PRINTED IN U. S. A. George H. Griffiths, *Secretary*

Owned by the United Publishers Corporation, 243 West 39th Street, New York. H. M. Swetland, *Pres.* Charles G. Phillips, *Vice-Pres.* A. C. Pearson, *Treas.* F. J. Frank, *Secy.*

BRANCH OFFICES—Chicago: Otis Building. Pittsburgh: Park Building. Boston: 410 Unity Building. Philadelphia: 1420-1422 Widener Building. Cleveland: Guardian Building. Detroit: 317 West Fort St. Cincinnati: Mercantile Library Bldg. Buffalo: 881 Ellicott Square. Washington: 26 Jackson Place, N. W. San Francisco: 320 Market St. London, Eng.: 11 Haymarket, S.W.1.

Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy 25 cents.

Entered as second class matter, June 18, 1879, at the Post Office at New York, New York, under the Act of March 3, 1879.

Radicals and the Steel Report

THE IRON AGE of last week gave a number of summarizing extracts from the 475-page book of Marshall Olds, just published by G. P. Putnam's Sons, "Analysis of the Interchurch World Movement Report on the Steel Strike." Mr. Olds, who is the author of "The High Cost of Strikes," brought out by the same publishers in 1920, set out to find the truth about the steel strike report and those who wrote it and gathered the material for it. He had found ground for the belief, first, that some of those connected with the Interchurch World Movement, who were credited with indorsing the report, had since repudiated it or were convinced that the investigators who prepared it were prejudiced in favor of the strikers. He had reason to believe, second, that many of the statements in the report concerning conditions in the steel industry were inaccurate. In the third place, he had evidence of "radical" leanings of some members of the investigating commission, and particularly of "radical" associations and views of a number of the technical advisors and investigators who drafted the report.

In great detail Mr. Olds sets forth the results of months of painstaking investigation on the three lines indicated above. In his evidence from within the Interchurch World Movement, he gives prominence to two statements. One is from Rev. Dr. William Hiram Foulkes, vice-chairman of the executive committee of the movement and acting chairman when the steel strike report was prepared. Dr. Foulkes says that "some of the investigators were not as unprejudiced as they should have been" and that "personally representing one side of the controversy their testimony was therefore liable to be discounted." The other is from Stanley Went of the publicity department of the movement, original editor of the Interchurch Report on the Steel Strike. He says he is happy to give Mr. Olds what assistance he can, that the latter's treatment of the subject in his book is moderate throughout, and that the prestige of the Interchurch World Movement was "used illegitimately in the dissemination as propaganda of this unfortunate steel report."

In last week's IRON AGE a summation was given of the 380 pages or more which Mr. Olds devotes to a thoroughgoing analysis of the alleged evidence, including affidavits by strikers and others, on which the main statements in the Interchurch report were based. In Part II Mr. Olds discusses the origin of the steel strike investigation and indicates by details of his own far-reaching and patient inquiry what sort of men the leaders of the Interchurch World Movement employed to accuse the steel industry.

Section after section of this recital tends to support as completely as could be desired the charge originally made by THE IRON AGE, namely, that "the investigators set out to get material for an indictment of the steel manufacturers of the country, and did not permit themselves to come back without what they went to get. That it [the steel report] was not a judicial investigation was made plain on page after page by innuendo, invective and unrestrained bitterness of a hired prosecutor."

Mr. Olds leaves no doubt in the minds of his readers as to the syndicalist beliefs and aims of Foster, the leader of the strike. What the daily press has recorded in the past year concerning Foster's latest exploits is a complete refutation of the claim put out by the Interchurch investigators that Foster had abandoned his syndicalism. The radical leanings of the writers of the report are brought out in a recital of their activities in socialist and kindred propaganda.

Mr. Olds's book, from the very considerable reading we have given it, seems to bear out the voucher for the author given by Prof. Jeremiah W. Jenks in the foreword. It is not free from inaccuracies, but they are of minor significance. It should have the very careful reading of the men who backed the steel strike report with their names and their influence, and of thinking men in the great on-looking public to whom that report brought so distorted and utterly unjust a view of conditions in the steel industry and of the aims of leading steel manufacturers.

The steel strike report was a stupendous blunder. It may never be known how far it has set back the forward movement in the industry to which earnest and progressive employers have given their best thought. Mr. Olds's book should antidote some of the harm that has been done. At least it should save the church from again being captured by

radical propagandists, and teach its leaders that in any future approach they may make to the solution of industrial problems, their hands must be clean and their motives above reproach.

Selective Immigration

Representatives of iron and steel companies who appeared last week before the House Committee on Immigration at Washington made a strong presentation of the attitude of manufacturers in regard to immigration. Some newspapers of prominence have made most unjust representations in regard to the attitude of steel manufacturers, declaring that they wanted to open wide the doors for all kinds of immigrants, so that the worst types of foreigners could be brought here, used for a time in steel works and mills, and then, as soon as they acquired a little intelligence, cast out, in order to bring in more of the ignorant and vicious classes from southern Europe.

The statements made by those who appeared before the House Committee show an intelligent, progressive and patriotic attitude. That of J. M. Larkin, assistant to the president of the Bethlehem Steel Co., was particularly arresting. Mr. Larkin showed that 5000 additional employees are needed for completely manning the present rate of Bethlehem operations. Labor shortage has caused the company to suspend needed construction work and has crippled production to some extent. He explained how, if business continues to expand as indicated at present, 15,000 more men will be needed, so that the entire labor requirements for this year will be 20,000 additional workers.

These are cold facts, but when Mr. Larkin went on to explain what is being done in carrying out the labor policy of the company, there was positive proof of interest in the men. It was shown that their comfort and safety are contributed to by safety devices, an efficient and humanely administered employment department, good housing and transportation conditions, relief in case of sickness and death, and conscientious efforts to prevent accidents and sickness. It was also brought out that wage payments are based upon and recognize employment efficiency, and that there is a complete conference system through elected representatives of the employees for the discussion and adjustment of conditions under which the employees have to work. These measures certainly do not indicate that the company desires to cater to the lower classes and keep them in squalor.

Another point made by Mr. Larkin related to education, and may well be considered an answer to the charge that steel companies wish to prevent employees from acquiring education and American ideals. He said that not ony is there a complete apprenticeship system affording systematic instruction, but also educational classes for people of foreign birth to assist them to become naturalized and qualified for advanced positions. Finally and emphatically, Mr. Larkin declared that he did not advocate wholesale admission of aliens, and believed it entirely possible to regulate the supply as to both numbers and quality, basing the regulations upon industry's needs rather than on fixed percentages.

The position taken by the Bethlehem company represents, we believe, the sentiment of the entire iron and steel industry. It is recognized that the solution of the problems of selective immigration is not an easy one, but there is substantial agreement on the main principles involved. Not a particle of evidence that the manufacturers wish to lower the average citizenship of the country has been brought forward, but the testimony is overwhelming that they wish to elevate the standard by admitting only desirable immigrants in numbers sufficient to meet the demands of industry. More and better immigrants are urgently needed.

Dealing with Absenteeism

Both annoying and costly is the amount of absenteeism among shop employees that develops in periods of good business. That much of it is unnecessary appears in the wide variation in idle hours as between good times and bad times.

A striking example is the experience of a large New England firm which today, operating on a 50 per cent basis of production, has an absentee factor of 2 per cent, whereas in 1919, operating at full capacity, the factor was 8 per cent. The workers average high in required skill, and include hundreds of expert mechanics and other specialists. The plant is modern in every respect, with the best hygienic conditions. At a time when the faithful performance of every worker was most needed, 8 out of every 100 on an average were absent, with a total of 8000 idle hours a week. While it is true that a known factor such as this can be provided against in part by maintaining an excess of working force, yet this is always unsatisfactory and costly.

In combating unnecessary absence, the company referred to has made its record of causes as complete as possible. Broadly three classes are recognized: absence resulting from an accident which for the time has incapacitated the employee for work, absence resulting from illness, and a third class which is labeled "personal." The present-day 2 per cent in the case in point represents accidents, honest illness and that side of "personal" which may be considered unavoidable, such as serious illness in the family, or bereavement, or other equally valid cause. Perhaps in comparing 1919 and 1923 allowance should be made for the slightly higher accident rate which generally comes with rushed production. But it is fair to presume that four years ago five or six persons out of every 100 were absent from their jobs simply because they preferred to do something else—to go fishing or out of town, to work in the garden or tinker the family automobile—and they felt that they could take time off without jeopardizing their jobs, labor being scarce, and even if absence brought dismissal another job could easily be found. In this general connection malingerers must be taken into account—those who "play sick" after they have fully recovered from an injury,

preferring accident compensation and idleness to labor. But this factor has grown smaller as the administration of compensation has become more efficient.

The best corrective of absenteeism so far discovered is a system of following up those who are out, to ascertain their reasons. Under ordinary circumstances a man thinks twice before taking time off without good reason, if he knows that the facts will come to the attention of his employer. Also, many times when an absentee has good reason, the situation can be helped to his satisfaction, as for example where there is sickness at home and a district nurse can be secured on the initiative of the shop management. Many plants have such a follow-up or "tracer" system. In the case of the company whose experience is cited, it was working at a high degree of efficiency in 1919, when absenteeism reached 8 per cent. It is fair to assume that without it the rate would have been higher, perhaps a good deal higher, since men and women would have found it easier, feeling prosperous financially, to yield to the lure of pleasure.

By-Product Coking for the Public

In the annual review number of THE IRON AGE, Jan. 4, 1923, there was given a complete list of all the by-product coke ovens in the United States, built and building. The total number of retorts is 11,931, the sum of the individual ratings being a carbonizing capacity of 65,380,200 net tons of coal in a year, producing 47,869,000 net tons of coke.

A scrutiny of this list now shows that 82.5 per cent of this capacity is owned directly by blast furnace interests. Of the remaining 17.5 per cent there is a little partial ownership, less than control, by furnace interests, while there is some capacity that was installed with the full expectation that the coke produced would be purchased by furnace interests. Finally, some of the producers definitely count upon selling coke to iron foundries. The small balance is for general consumption.

The producers of by-product coke who operate blast furnaces do not sell coke as a rule. They sell breeze, and occasionally they may sell coke of regular furnace quality, but the entire essence and purpose of the installation is to produce coke for blast furnace use. Those who may be called, for distinction, the "merchant" producers of by-product coke, sell some for blast furnace use. Thus while the count as to ownership shows 82.5 per cent consumer production and 17.5 per cent merchant production, the actual fact is that fully 85 per cent of the by-product ovens rest directly upon blast furnace consumption and not more than 15 per cent rests upon public consumption. As to gas, few of the furnace-owned ovens sell it to the public, the usual thing being for the gas to be consumed in attendant steel works.

From the viewpoint of physical efficiency this alinement is, as a matter of fact, very peculiar. Essentially, the by-product oven is an apparatus that should operate continuously. Blast furnace operations, on the contrary, are highly intermittent in character. Less than half as much pig iron was made in 1921 as in 1920. In 1916 two-thirds more was made than in 1914. With no conceptions drawn from observation, it is hardly fanciful to assert that an ordinary man would judge that the worst place to put by-product coke ovens is next to a blast furnace. The demand in coke and gas of the domestic user and of public utilities is vastly more constant than is the demand of the blast furnace.

Of course there is a reason for this 85-15 proportion. There is no physical reason, but rather the reverse. The reason is financial. The steel interests had not a perfect market but a fair market for the coke and gas, in their own consumption, and the few purely furnace interests that installed by-product ovens had such a market in coke though not in gas. The market was not good, being intermittent in character, but it was a known market. The construction could be financed on account of the backing these producers had in their existing properties.

When pig iron production is at a low rate by-product coke loses less than beehive coke. When it is at a high rate much beehive coke must be used. Thus there is no definite proportion, and one may take it that as matters now stand from 65 to 80 per cent of the coke used in blast furnaces will be by-product. From the furnace viewpoint the work of building by-product coke ovens is nearly completed.

From the standpoint of general utility, considering that we may mine 500,000,000 to 600,000,000 tons of bituminous coal in a year and can carbonize in by-product ovens only 65,000,000 tons theoretically, and only 80 or 85 per cent as much practically, the work has only begun. The economy in the process should be greater with the steady consumer, still to be provided for, than with the irregular consumer who has adopted the practice.

An outstanding feature of the major non-ferrous metal market in 1922 was the uniformly strong position of lead. Both prices and consumption tended steadily upward. At the opening of the year 4.70 cents per pound, New York, was the price and as high as 7.35 cents was realized in December, with 7.25 cents as the market at the year's end. The 1912 and 1913 maximum was 5.06 cents, and the averages for the two years were 4.47 cents and 4.40 cents. In consumption, last year was one of the most prosperous, a large demand coming from cable, paint and storage battery sources. The vast amount of building explains the paint demand and the prosperity of the automobile industry accounts for the larger use of batteries. The consumption of lead by the battery industry is very large, lead in plates being a chief essential. Not only has the larger use of automobiles and trucks contributed to this demand, but the expansion in lighting systems for passenger cars and also the need of large batteries for the dial telephone systems. The conservative price policy of the large producers in the past year has contributed, without doubt, to the widening of their market, so that among the non-

ferrous metals the position of lead is generally recognized as one of conspicuous strength.

An impressive list of alloys, principally non-ferrous, has been made public by the American Society for Testing Materials as part of the work of one of its committees. That they number about 1500, some with only slight variations in composition, is a revelation. The success of the comparatively recent attempts to make corrosion and heat-resisting alloys appears from the fact that these already number about 125, and several of the newer ones are not mentioned. Adding the large number of alloy steels to this list raises the question at once whether we are not coming rapidly into the alloy age. Many of the great strides of recent years, as in the automobile and airplane industries, are due primarily to alloys. There have been distinct changes in some industrial operations, particularly chemical, from the use of alloys. Many of these pronounced developments would not have been possible except for the perfection of the electric furnace and the art of heat treatment. The high temperature units in particular have made possible many special alloys, and only through heat treatment have a large number of steel and non-ferrous alloys been brought to their highest usefulness.

ENGINEERING COUNCIL MEETS

Investigation Similar to That of Waste and Two Shift Day to Be Undertaken

The waste report and the report on the two-shift day in continuous industry were characterized as two outstanding accomplishments of world importance by Dean Mortimer E. Cooley of the University of Michigan, in his address to the American Engineering Council of the Federated American Engineering Societies at the annual meeting of the council held in Washington Jan. 11 and 12.

The two-shift report is available in printed form and the committee which prepared it has been formally discharged by the executive board of the council. A third undertaking of similar magnitude was likely to be set in motion in the near future, it was announced.

The report of the executive secretary, L. W. Wallace, who was re-elected by the executive board, showed that Federal legislation in which the Federation through the executive secretary has taken an active interest includes the Sterling-Lehlbach bill, topographic mapping, helium, national hydraulic laboratory, and revision of the mining laws.

The council adopted the report of its patents committee requesting "that a joint commission be appointed by the Senate and House of Representatives to investigate the needs of the patent office, both as to personnel and physical equipment and that it be requested to report at an early date, so that the present session of Congress may take appropriate action."

Dean Cooley was unanimously re-elected president of the Council for 1923. J. Parke Channing and Calvert Townley, New York; Philip N. Moore, St. Louis; Gardner S. Williams, Grand Rapids, Mich., were elected vice-presidents, and H. E. Howe of Washington was elected treasurer.

The next meeting of the executive board will be held in Cincinnati, in the last half of March, the exact date to be fixed later.

Machine Tools to Be Subject of Meeting

Machine tools will be the subject of a meeting to be held Feb. 27 at the Engineers Club, Philadelphia, under the joint auspices of the Engineers Club of that city, and the Philadelphia sections of the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

Milling cutters, the influence of differences in design on power consumption and capacity, will be the subject of an address by James A. Hall, associate professor of mechanical engineering, Brown University, and Benjamin P. Graves, milling machine engineer, Brown & Sharpe Mfg. Co. The design and manufacture of large machine tools will be presented by George H. Benzon, Jr., engineer, William Sellers Co., at the same session.

The history of the machine tool and its effect on present day civilization will be outlined by Dean Dexter S. Kimball, Cornell University, at the evening session. Ernest F. Du Brul, general manager, National Machine Tool Builders' Association, will address the meeting on "Some Features of the Economic Situation of the Machine Tool Industry."

John Lyle Harrington, president of the American Society of Mechanical Engineers, will address the evening session.

Labor Shortage Discussed

BUFFALO, Jan. 16.—Representatives of industrial and technical education held meetings in the Buffalo State Normal School, Jan. 12, for the purpose of discussing remedies for the shortage of skilled workers in various industries, and considered proposals for remedial measures. Training apprentices was one of the topics of the conference which was attended by representatives of employers and labor. The proposed bill authorizes the State Department of Education to appoint committees representing the various trades and crafts to set up reasonable and desirable standards for apprentice training and to inspect the apprentice training maintained by an employer upon such employer's request and, if found satisfactory, to approve the apprentice course.

Chicago Foundrymen's Club

The Chicago Foundrymen's Club at a meeting at the City Club, Chicago, Jan. 13, elected the following officers for 1923: President, George E. Carlin, Carlin Foundry & Machine Co., La Porte, Ind.; vice-president, A. W. Gregg, Whiting Corporation, Harvey, Ind.; secretary-treasurer, George H. Manlove, Penton Publishing Co., Chicago; directors, Alex Dapogny, Chicago Steel Foundry, Chicago; E. A. Grindle, International Harvester Co., Chicago; C. B. Sherwin, Chicago Hardware Foundry Co., North Chicago, Ill.; C. B. Carter, Alloys Foundry Co., Chicago.

Cost of Living Higher

Figures of the National Industrial Conference Board show an increase of 1.8 per cent in the cost of living in November as compared with July. The November figure is 58.4 per cent above the cost for July, 1914. It is, however, 22.5 per cent lower than in July, 1920, when the cost of living for the United States reached its peak. Fuel and light, 86 per cent above July, 1914, is actually 12 per cent higher than in July, 1920, at the peak of living costs. Rents are now 67 per cent above July, 1914; clothing is 60 per cent above July, 1914; food is 45 per cent higher than before the war.

Following the recent purchase by the Western Electric Co. from Joseph P. Day of a 35-acre tract on Kearny Meadows in New Jersey, it was announced that construction will be commenced at once on a new unit where telephone cable will be manufactured. Operations in the new plant will be designed to supplement those now carried on at the Hawthorne plant in Chicago.

Iron and Steel Markets

MORE PRICE ADVANCES

Mills Well Sold on Heavy Products for First Quarter

Activity in Plates and Other Products—New England Embargoes a Factor

Steel companies are becoming so well sold up for the first quarter of the year that they are naming higher prices on what they have left for that delivery, particularly on plates, structural shapes and bars, and are selling sparingly. This policy has become more general in the past week.

Manufacturing consumers of steel in various lines have been increasing their production schedules and in view of stiffening prices and slow deliveries are seeking to place new orders. Thus both buyers and sellers are contributing to a stronger market.

The rate of operations in the Pittsburgh and Youngstown districts has gone as high as 85 per cent in some cases, and the Bellaire plant of the Carnegie Steel Co. is to come in this week.

In the East a disturbing factor is the sweeping New England embargo which limits ingoing shipments to food and coal. The snowfall in that section has been twice the normal, whereas the Central West, the heart of the steel industry, has been unusually free of snow—a condition most fortunate in view of present heavy demands upon capacity. Nearly all independent producers of plates, shapes and bars have advanced to 2.10c., Pittsburgh, and the Carnegie Steel Co. has gone to that figure on plates and shapes. The buying of plates has been particularly heavy, and some makers are asking from $3 to $5 a ton above the 2c. level.

At Chicago additional oil tank work has come up that will take 30,000 to 45,000 tons of plates. At Pittsburgh 26 steel barges have been let requiring 4200 tons of steel, largely plates. At Philadelphia the week's plate business included 4000 to 5000 tons for the Baldwin works, 3000 tons for the Pennsylvania Railroad and 3000 tons for the Reading.

Pittsburgh mills have had heavy specifications from the automobile industry. Other sources that have been heard from this week are the agricultural works, which are now planning a 50 per cent operation, the builders of tanks and barges, who have taken some good orders; also the builders of steam shovels and cranes, who are now manufacturing for stock, anticipating increased demand in the spring. Also the smaller railroad equipment manufacturers have been particularly active in securing steel supplies.

Large expectations of house building are seen in the effort of distributers of merchant pipe to enter orders which in some cases represent twice their average allotments.

The American Steel & Wire Co. in the face of labor shortage has worked up to a 77 per cent operation, but is still rationing its output in view of heavy commitments.

Available supplies of semi-finished steel do not meet the current demand, and prices are advancing. An unusual inquiry is for 5000 to 10,000 tons of billets for the Steel Corporation's plant at Pencoyd, Pa.

The Standard Oil Co. of New Jersey, which some weeks ago was credited with buying 200,000 boxes of tin plate abroad, is now in the market for upward of 400,000 boxes, some of it for the second quarter and the remainder for the second half of the year.

The Pennsylvania Railroad has placed with the Baldwin and its own Altoona works 225 locomotives and is to buy 75 more. Other roads are inquiring for 93.

December bookings of fabricated steel work, the Bureau of the Census finds, were 20 per cent greater than those of November. The total for last year, 1,929,400 tons, is one-sixth greater than the war demand for either 1915 or 1916, and the highest on record.

The movement of pig iron has been greatly retarded by embargoes due to heavy snows, particularly in New England. Pig iron prices are well maintained, barring some slight shading at Pittsburgh and in southern Ohio. For second quarter delivery, Southern iron has sold at $24, an advance of $1 over the first quarter price, and some furnaces are asking $25.

Not enough time has elapsed to disclose what effect the occupation of the Ruhr Valley by the French will have on the pig iron market. Some reports indicate that the movement from Belgium, France and Germany to other countries will be retarded for a time at least, making it possible to export from the United States. One exporter is receiving bids on 2000 tons of foundry grades for shipment to Chile. In steel products Germany has been for some time so small a figure in markets to which American steel chiefly goes that the investment of Ruhr works does not signify greatly.

Ferromanganese, which was advanced $2.50 last week, is now up $5 more, or to $107.50 at seaboard. In view of the rapid rise of British makers' fuel costs ferromanganese is likely to go higher.

The eastern Pennsylvania scrap market, with New England supplies cut off, has gone $1 to $2 higher.

Pittsburgh

Many Mills Withdraw from Market—Finished Material Trend Upward

PITTSBURGH, Jan. 16.—Mills in this district have become so well sold up for the first quarter on the heavy tonnage products that they have either withdrawn from the market or are naming higher prices. Independent mills still open for business are generally quoting 2.10c., base Pittsburgh, on plates, shapes and bars, and in this move there has been partial acquiescence by the Carnegie Steel Co., which while holding at 2c. base, for bars, has gone to the 2.10c. for plates and shapes.

As pointed out in THE IRON AGE last week, the Carnegie Steel Co. has been a prime beneficiary in the railroad orders which have recently been placed by Eastern lines, and in the past week it has received heavy specifications from the automotive industry. Its action in raising prices of plates and shapes undoubtedly is based upon its sold up condition, evidence of which is

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Jan. 18, 1923	Jan. 11, 1923	Dec. 19, 1922	Jan. 17, 1922
No. 2X, Philadelphia‡	$29.76	$29.76	$28.76	$21.34
No. 2, Valley furnace†	27.00	27.00	25.00	19.50
No. 2, Southern, Cin'ti†	27.05	27.05	27.05	20.50
No. 2, Birmingham, Ala.†	23.00	23.00	23.00	16.00
No. 2 foundry, Chicago*	29.00	29.00	28.00	19.00
Basic, del'd, eastern Pa.	28.00	28.00	27.50	20.25
Basic, Valley furnace	26.00	26.00	24.25	18.25
Valley Bessemer, del. P'gh	29.27	29.27	29.27	21.46
Malleable, Chicago*	29.00	29.00	28.00	19.00
Malleable, Valley	27.00	27.00	26.00	19.50
Gray forge, Pittsburgh	28.27	28.27	26.27	20.96
L. S. charcoal, Chicago	33.15	33.15	33.15	31.50
Ferromanganese, del'd	107.50	102.50	100.00	60.00

Rails, Billets, etc., Per Gross Ton:	Jan. 18, 1923	Jan. 11, 1923	Dec. 19, 1922	Jan. 17, 1922
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$40.00
Bess. billets, Pittsburgh	37.50	36.50	36.50	28.00
O.-h. billets, Pittsburgh	37.50	37.50	36.50	28.00
O.-h. sheet bars, P'gh	37.50	37.50	36.50	29.00
Forging billets base, P'gh	43.00	43.00	41.50	32.00
O.-h. billets, Phila.	43.67	42.17	43.17	33.74
Wire rods, Pittsburgh	47.50	47.50	45.00	36.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	2.00	2.00	2.00	1.50
Light rails at mill	2.15	2.15	2.10	1.50

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.325	2.325	2.275	1.81
Iron bars, Chicago	2.35	2.35	2.35	1.60
Steel bars, Pittsburgh	2.00	2.00	2.00	1.50
Steel bars, Chicago	2.10	2.10	2.10	1.60
Steel bars, New York	2.34	2.34	2.34	1.88
Tank plates, Pittsburgh	2.10	2.00	1.95	1.50
Tank plates, Chicago	2.30	2.30	2.30	1.60
Tank plates, New York	2.44	2.34	2.29	1.83
Beams, Pittsburgh	2.10	2.00	2.00	1.50
Beams, Chicago	2.20	2.20	2.20	1.60
Beams, New York	2.44	2.34	2.34	1.88
Steel hoops, Pittsburgh	2.75	2.75	2.75	2.00

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Jan. 18, 1923 Cents	Jan. 11, 1923 Cents	Dec. 19, 1922 Cents	Jan. 17, 1922 Cents
Sheets, black, No. 28, P'gh	3.35	3.35	3.35	3.00
Sheets, galv., No. 28, P'gh	4.35	4.35	4.35	4.00
Sheets, blue an'l'd, 9 & 10	2.50	2.50	2.50	2.25
Wire nails, Pittsburgh	2.70	2.70	2.70	2.50
Plain wire, Pittsburgh	2.45	2.45	2.45	2.25
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.15
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$4.75

Old Material, Per Gross Ton:	Jan. 18, 1923	Jan. 11, 1923	Dec. 19, 1922	Jan. 17, 1922
Carwheels, Chicago	$27.00	$27.00	$24.00	$15.50
Carwheels, Philadelphia	23.00	21.00	20.00	16.50
Heavy steel scrap, P'gh	22.00	22.00	20.00	14.50
Heavy steel scrap, Phila.	20.00	19.00	16.50	11.50
Heavy steel scrap, Ch'go	19.25	19.00	17.50	11.50
No. 1 cast, Pittsburgh	23.00	23.00	22.50	16.50
No. 1 cast, Philadelphia	23.00	23.00	20.00	16.50
No. 1 cast, Ch'go (net ton)	21.50	21.50	20.00	13.00
No. 1 RR. wrot., Phila.	23.00	21.50	19.00	14.50
No. 1 RR. wrot., Ch'go (net)	18.00	18.00	15.25	10.50

Coke, Connellsville, Per Net Ton at Oven:	Jan. 18, 1923	Jan. 11, 1923	Dec. 19, 1922	Jan. 17, 1922
Furnace coke, prompt	$8.00	$7.75	$7.00	$2.75
Foundry coke, prompt	8.50	8.50	8.00	3.75

Metals, *Per Lb. to Large Buyers:*	Jan. 18, 1923 Cents	Jan. 11, 1923 Cents	Dec. 19, 1922 Cents	Jan. 17, 1922 Cents
Lake copper, New York	14.87½	14.75	14.50	13.87½
Electrolytic copper, refinery	14.50	14.50	14.37½	13.62½
Zinc, St. Louis	6.87½	7.00	7.00	4.77½
Zinc, New York	7.22½	7.35	7.35	5.12½
Lead, St. Louis	7.75	7.25	6.87½	4.40
Lead, New York	7.95	7.50	7.25	4.70
Tin (Straits), New York	38.75	38.25	38.12½	32.00
Antimony (Asiatic), N. Y.	6.75	6.60	6.30	4.45

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.
The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Jan. 16, 1923, Finished Steel, 2.474c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel

Jan. 9, 1923,	2.446c.
Dec. 19, 1922,	2.439c.
Jan. 17, 1922,	2.062c.
10-year pre-war average,	1.689c.

Composite Price, Jan. 16, 1923, Pig Iron, $26.63 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Jan. 9, 1923,	$26.63
Dec. 19, 1922,	25.42
Jan. 17, 1922,	18.52
10-year pre-war average,	15.72

found in the fact that demands upon the independents, particularly for plates, have assumed high proportions lately. The smaller railroad equipment manufacturers have been particularly active in their search for supplies, and there also has been a lively inquiry from the builders of tanks and barges. The trend of prices of steel products generally is upward, and the common belief is that second quarter business will command advances over current levels. The American Sheet & Tin Plate Co. is bound by its announcement of last fall to present prices on sheets for the first half of this year, but independent manufacturers have not sold beyond April 1, and as they are now very well filled up for the present quarter, they are expected to announce higher prices when they open books for second quarter tonnages. It is a persistent report that the American Steel & Wire Co. is planning to soon follow the advances recently named by independent producers of wire products. The development of an extremely active demand for pipe, with distributors endeavoring to enter orders for as much as twice their average allotments, is believed to be based on expectations of higher prices. Available supplies of semi-finished steel are insufficient for current demands and prices exhibit marked firmness. Hardly enough business is being done in pig iron to establish any definite change in pig iron prices, but transactions of the week have disclosed that on round lots of foundry iron the market is not above $27, Valley Furnace, as against $28 asked and obtained for single carloads.

The scrap market is very firm, but this is in sympathy with outside markets, since local melters still are inactive. There is a slightly steadier market in coke and coal than a week ago, since there has been a partial revival of demand for domestic use and industries are accumulating reserve supplies against winter shortages. Although complaints are common of a shortage of labor, it is noted that plant operations here and in nearby districts hold up to the recent rate. The Carnegie Steel Co. will have both of its Bellaire, Ohio, blast furnaces in operation by the end of the week, bringing its active furnaces to 45 out of a total of 59. The Republic Iron & Steel Co., Youngstown, will put on another furnace as soon as supplies of coke are available.

Pig Iron.—If there is a definite tendency to prices here, it is downward. With important melters well covered against their requirements for the next few months, the inquiry is almost entirely from the small users and the appearance of a few fair sized inquiries has produced a slight modification of the extreme price ideas of some producers. By way of example, it can be stated

that on a recent inquiry for about 1000 tons of foundry iron, some of the Valley furnaces went to $27 for No. 2 grade and are even said to have named that price on No. 2X grade. Even that price, however, did not secure the order, which went to an outside point, with a freight rate 75c. per ton over the rate from the Valley to destination. We note a couple of sales of Bessemer iron, each of 500 tons, at $27.50, Valley furnace, the same price which has ruled for several weeks. Absence of business makes it hard to clearly define the market on basic iron, but it is believed that a sizable tonnage would bring out a lower price than $26, which is the minimum quotation of producers.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.77 per gross ton:

Basic	$26.00 to $27.00
Bessemer	27.50
Gray forge	26.50 to 27.50
No. 2 foundry	27.00 to 28.00
No. 3 foundry	26.50 to 27.50
Malleable	27.00 to 28.00
Low phosphorus, copper free	35.00 to 36.00

Ferroalloys.—The advance to $102.50 Atlantic seaboard for 80 per cent ferromanganese had hardly set before British producers made another advance, this time of $5 a ton to a basis of $107.50, and domestic producers have followed the change, which became effective Jan. 11. Only a few hundred tons were sold at $102.50 seaboard, as most users in this territory filled up at $100 and only a few deals were pending when the latest increase was announced. It is claimed that costs abroad are increasing and the fear that French occupation of German soil may cause trouble also is believed to be a factor in the advance. Interest in other ferroalloys is low, as consumers are covered against their requirements for some time ahead and with producers well filled up there is no pressure for supplies or for orders. The Jones & Laughlin Steel Corporation this week will take off one of its Aliquippa furnaces now making iron and put it on ferromanganese.

We quote 80 per cent ferromanganese at $100 furnace, $107.50 seaboard, or $112.29 delivered Pittsburgh district for domestic or British, and 76 to 80 per cent German at $67 c.i.f. Atlantic seaboard. Average 20 per cent spiegeleisen, $33 to $35, furnace; 16 to 19 per cent, $32 to $34; 50 per cent ferrosilicon, domestic, $82.50 to $85, delivered. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $44.50; 11 per cent, $47.80; 12 per cent, $51.10; 13 per cent, $55.10; 14 per cent, $60.10; silvery iron, 6 per cent, $33; 7 per cent, $34; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $39.50; 11 per cent, $42; 12 per cent, $44.50; 13 per cent, $47. The present freight rate from Jackson and New Straitsville into the Pittsburgh district is $3.66 per gross ton.

Billets, Sheet Bars and Slabs.—Those in need of tonnages for delivery over the next 60 to 90 days are having much trouble in placing them, because makers are so well sold up. Business suffers from that fact more than from a lack of demand. The American Steel Co., Pittsburgh, wants 10,000 tons of sheet bars for shipment in equal amounts for the next five months. The National Tube Co. still is in the market for Bessemer billets, or will take Bessemer skelp for lap welded pipe. It is doubtful whether billets, sheet bars or slabs can be bought at less than $37.50, Pittsburgh or Youngstown, while those makers who can take business and assure deliveries, generally are asking $38.50.

We quote 4 x 4-in. soft Bessemer and open-hearth billets, $37.50 to $38.50; 2 x 2-in. billets, $37.50 to $39.50; Bessemer sheet bars, $37.50 to $38.50; open-hearth sheet bars, $37.50 to $38.50; slabs, $37.50 to $38.50; forging billets, ordinary carbons, $43 to $47.50, all f.o.b. Pittsburgh or Youngstown mills.

Wire Rods.—Business is restricted by the scarcity of supplies, most makers being committed against production over the first quarter of the year and at the moment production does not exceed specifications. Such tonnages as are becoming available usually are sold without much trouble at $47.50 base, but the common asking price is $50 and that price is occasionally obtained from a buyer who is in need of early supplies.

We quote No. 5 common basic or Bessemer rods, $47.50 to $50; chain rods, $47.50 to $50; rivet bolts and other rods of that character, $47.50 to $50; screw stock rods, $52.50 to $55 per gross ton f.o.b. Pittsburgh or Youngstown. Carbon rods command $3 per ton over base for 0.20 to 0.40 carbon; $5 over base for 0.41 to 0.55 carbon; $7.50 over base for 0.56 to 0.75 carbon and $10 over base for over 0.75 carbon; acid rods, $15 over base.

Plates.—Mills here and in nearby districts lately have been getting heavy orders and demand still is very brisk in connection with railroad cars, tanks and barges. Independent mills have generally advanced to 2.10c. base, Pittsburgh, and on unattractive tonnages at least one maker is up to 2.25c. The American Bridge Co. has taken 20 steel barges for the Pittsburgh Coal Co. and six for the J. K. Davison & Brothers, Pittsburgh, the 26 barges involving 4200 tons of steel, mostly plates. Prices are given on page 251.

Structural Material.—Structural business in this immediate district still is of very moderate proportions, but local fabricators are figuring on a large number of inquiries and between the protection given against these inquiries and actual orders from outside points, the mills here are pretty heavily committed and are seeking advances on strictly new business. Practically all mills now are quoting 2.10c., Pittsburgh, and 2c. appears to be passing as the regular quotation. Prices are given on page 251.

Iron and Steel Bars.—The Carnegie Steel Co. is still holding at 2c. base, Pittsburgh, for both soft and hard steel bars and the Jones & Laughlin Steel Corporation has not formally abandoned this quotation, but other producers open for business now are quoting 2.10c. base. For reasonably early delivery, 2.10c. is probably as low as any business now can be placed. Iron bars are firm and unchanged.

We quote steel bars rolled from billets at 2c.; reinforcing bars, rolled from billets, 2c. base; rail steel reinforcing bars, 1.90c. to 2c.; refined iron bars, 2.60c. in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Talk of a serious shortage is beginning to be heard and there seems to be some ground for such a possibility in view of the fact that orders still are flowing in freely and present obligations are of size that will tax capacity of the mills for at least 60 days. Moreover, it is several years since the mills faced the spring requirements with such a small stock of the various products. One maker, who a year ago had more than 300,000 kegs of nails in stock, is starting this year with less than 1 per cent of that total and this is typical of other makers. Consumption has been absorbing production for some time and it has been impossible for makers to accumulate any surplus stocks against the spring demands. Small sales of nails have been made for early delivery at $2.80 per keg base. On spring wire 3.35c., base, now is minimum. Some makers hesitate to adopt the extra of 15c. per 100 lb. to jobbers on annealed wire, in the fear that with the advent of normal conditions it could not be maintained. Prices are given on page 251.

Steel Rails.—Makers of new steel light rails have sufficient business on their books to be indifferent about additional orders except at the full price of 2.15c., base, and we regard the market as firm at that figure, though current demands are moderate. Light rails, rolled from old standard sections, still are available at 2c., base, and this may account for the lack of real activity in new steel rails.

We quote 25 to 45-lb. sections, rolled from new steel, 2.15c. base; rolled from old rails, 2c. base; standard rails, $43 per gross ton mill for Bessemer and open-hearth sections.

Rivets.—Makers report buyers to be specifying freely and it is claimed that no price concessions have been necessary to obtain the orders. Prices and discounts are given on page 251.

Hot-Rolled Flats.—A price above 2.75c. base does not yet find much support in sales. As high as 2.90c. is quoted and is obtained on small lots, and occasionally on a good sized tonnage of narrow light gage material, for which the competition is not very sharp, since a number of the mills are not for such material. Specifications are coming along with much greater freedom now than was the case a few weeks ago. Prices are given on page 251.

Cold-Rolled Strips.—Makers are well obligated, specifications against orders are coming along freely and the market is firm at 4.50c. base, Pittsburgh.

Bolts and Nuts.—Makers in this district are well supplied with orders and report that specifications are coming forward in satisfactory fashion. As partial ex-

planation of this condition, however, it is admitted that quantity buyers have had price inducements of as much as 10 per cent beyond the regular discount. Quoted discounts are given on page 251.

Steel Skelp.—Pipe skelp of the ordinary sizes and gages still can be placed at 2c., for either grooved or sheared, but on narrow stock, particularly of light gage for boiler tubes, makers are asking 2.40c. to 2.50c. and report some sales at those figures for early delivery. The Tyler Tube & Pipe Co. is in the market for 500 tons of boiler tube skelp and the National Tube Co. is seeking Bessemer skelp for lap welded pipe.

Cold-Finished Steel Bars and Shafting.—There is no change in prices, the market still being quotable at 2.50c. base, Pittsburgh. There is renewed talk, however, of an advance, due to the fact that most of the independent makers of hot-rolled bars lately have gone to 2.10c. base. Tonnage offered makers is large, but there is complaint that some of it is undesirable because so many different sizes are included in the individual inquiries. Ground shafting is firm and unchanged at 2.90c. base, f.o.b. mill, for carload lots.

Sheets.—Bookings of independent producers show no appreciable falling away and probably it is no exaggeration to state that these interests now are pretty well obligated against first quarter production. The leading interest for some time has been sold out for this period and probably has a fair amount of second quarter business since its prices run for the first half of this year instead of for the first quarter as with the independents. It is generally expected that the latter will ask higher prices for second quarter tonnages; indeed, some of them are asking 2.60c. to 2.75c. base for blue annealed sheets on such tonnages as they can enter for delivery between now and April 1.

Tin Plate.—Pressure for shipments on contracts is surprisingly heavy for the time of year and a very considerable amount of new business is being offered. Mill operations are on a high rate, but they need to be in view of the way the container manufacturers are urging shipments. The leading interest is operating about 85 per cent of capacity and expects to increase to about 90 per cent when the Bellaire, Ohio, works, Carnegie Steel Co., resumes operation. A blast furnace is scheduled to go on today at that plant and another one on Friday or Saturday of this week, with a resumption of the steel works soon afterwards. There is close observance of the regular price of $4.75 per base box, Pittsburgh, for standard cokes.

Boiler Tubes.—Shortage of lap-welded steel tubes is unrelieved and buyers who must have deliveries between now and April 1 are having considerable trouble in interesting the mills. The supply situation in seamless tubes is relatively easy and it is said that the leading interest is substituting seamless for lap welded tubes in some instances. High prices restrict, but do not altogether prohibit buying of iron boiler tubes. Discounts are given on page 251.

Iron and Steel Pipe.—There is no abatement in the demand for steel pipe; on the contrary, distributors are trying to get the mills to enter orders for as much as twice their average allotments, possibly because they sense an advance in prices. The Wheeling Steel Corporation is the only maker of steel pipe that has made any change, but there is much talk that others will advance before long, especially as the past few weeks have seen a considerable expansion in the demand for oil country and line pipe. All makers are 60 to 90 days behind their orders in standard pipe and some of the mills no longer are able to promise deliveries against oil country pipe orders in less than six weeks.

Steel Chain.—Leading makers have advanced prices $5 per ton to 6.25c. per lb. for the base sizes, 1-in. to 1¼-in., proof coil chain. High cost of rods and bars are offered in explanation of the advance. Furthermore, makers have become filled up for the present quarter.

Coke and Coal.—Although railroad embargoes still are effective in keeping down Eastern demands for coke and soft coal to replace hard coal, there has been a slight increase in buying of this sort and that, together with purchases for reserve supplies against possible shortages during the remainder of the winter, has produced a slightly firmer market. Lately furnace coke has not been below $8 per net ton, oven, for standard grade, and there have been some sales at 25c. to 50c. per ton higher. Contracts for small tonnages for shipment over the remainder of the present quarter have been made at $8. On foundry grades the market is quotable at $8.50 to $9 per net ton at ovens, or at the same prices as ruled a week ago. Coal is quoted at $3 to $3.50 per net ton at mines for mine run steam, $3.75 to $4 on mine run coking coal and $4 on mine run gas coal.

Old Material.—The market here still has a very strong undertone, but this is in sympathy with outside markets rather than because of a good demand from Pittsburgh mills. It is reported that heavy melting steel from the East has sold at $20 at Bethlehem, and allowing for freight differential between that point and Pittsburgh, this is equivalent to $22.50 here. This grade has been offered to local mills at $22.50, but they have not been interested. Small sales recently were made at $23 at Steubenville, but this is hardly typical in view of the fact that some railroad specialties were included in the sales. The market is slightly stronger on blast furnace grades, but we continue other grades at the prices of a week ago.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton	
Heavy melting steel (nominal)	$22.00 to $22.50
No. 1 cast, cupola size	23.00 to 23.50
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va.; and Franklin, Pa.	22.00 to 22.50
Compressed sheet steel	20.50 to 21.00
Bundled sheet sides and ends	19.00 to 19.50
Railroad knuckles and couplers	24.00 to 24.50
Railroad coil and leaf springs	24.00 to 24.50
Low phosphorus standard bloom and billet ends	25.50 to 26.00
Low phosphorus, plates and other grades	24.50 to 25.00
Railroad malleable	21.00 to 21.50
Iron car axles	29.00 to 30.00
Locomotive axles, steel	24.00 to 25.00
Steel car axles	22.50 to 23.00
Cast iron wheels	23.00 to 23.50
Rolled steel wheels	24.00 to 24.50
Machine shop turnings	17.00 to 17.25
Heavy steel axle turnings	18.50 to 19.00
Short shoveling turnings	18.50 to 19.00
Cast iron borings	19.00 to 19.50
Heavy breakable cast	20.00 to 20.50
Stove plate	17.00 to 17.50
Sheet bar crop ends	23.00 to 23.50
No. 1 railroad wrought	20.50 to 21.00

To Liquidate Carbon Steel Co.

PITTSBURGH, Jan. 16.—A committee headed by James Wardrop and Bruce Orr, of Pittsburgh, has been appointed to liquidate the Carbon Steel Co., Pittsburgh. One Pittsburgh bank holds notes of the company amounting to $1,200,000, and another holds a mortgage of $500,000 on the blast furnace of the Kittanning Iron & Steel Mfg. Co., Kittanning, Pa. The latter company, which owns a blast furnace with a daily capacity of 400 tons, completed in 1908 and first operated in 1912, a bar iron plant comprising 31 single puddling furnaces, a squeezer and a 22-in. three-high one stand muck bar mill having an annual capacity of 20,000 tons, and 1500 acres of coal land, is controlled by the Carbon Steel Co., with a 51 per cent holding of the stock. This interest in the Kittanning company, together with a 125-acre plant site on the opposite side of the Allegheny River, is held by the Union Trust Co. as collateral against the notes.

The Carbon Steel Co. is one of the oldest in Pittsburgh, having been started in Civil War times. The plant, built in 1862, was rebuilt in 1888, and comprises six 50-ton basic open-hearth furnaces, one 6-ton electric furnace, one 36-in. universal mill, two 16-in. and one 10-in. bar mills, one sheared plate mill 20 in. and 34 in. by 128 in., one 32-in. sheet mill and one 32-in. jobbing mill. It has an annual capacity of 150,000 tons of soft and alloy steel ingots, 60,000 tons of billets and slabs, 70,000 tons of plates, 20,000 tons of sheets and 50,000 tons of bars. The capital of the company is $3,000,000 common, $500,000 first preferred and $1,500,000 second preferred stock.

Chicago

Strong Demand for Steel—Pig Iron Quiet But Prices Firm

CHICAGO, Jan. 16.—Demand for finished steel is broader and more insistent than it has been at any time during the past 12 months. Bookings of a leading mill thus far in January are twice those for the same period in December, notwithstanding sustained buying throughout the holiday season. At the same time, considerable business is being turned away because local mills cannot make the deliveries desired. One Chicago producer, in fact, is sold tight for the quarter on plates, shapes, bars and sheets and is not yet ready to take second quarter orders. Under the circumstances, some important tonnages are being placed with mills farther east, one order for the plain material for a bridge amounting to more than 2000 tons.

Mill operations are well maintained, but there seems to be little hope for further increase in output. The Illinois Steel Co. continues to produce at 83 per cent of ingot capacity with 10 blast furnaces active at Gary, eight at South Works and two at Joliet, or 20 out of its 27 steel works stacks. It is also operating one of its two merchant furnaces at Milwaukee. The Inland Steel Co. has all three blast furnaces in and is operating its mills at from 75 to 80 per cent of capacity. Further gains in output are blocked by fuel difficulties. No coal reserves have been built up and lack of cars at their own mines has forced producers to buy considerable coal. A year ago, large fuel reserves enabled blast furnaces to continue operating until August. A strike this year would soon result in the wholesale banking of active capacity, it is feared.

Ferroalloys.—Ferromanganese has again advanced, this time to $107.50, seaboard. This commodity is believed to be due for a still further rise, as the fuel costs of British producers are rising rapidly with the increase in coal shipment to the continent. We note a recent sale of spiegeleisen at $45.05, delivered. Melters are manifesting more interest in spiegeleisen in view of the recent sharp advances in ferromanganese. A leading producer of 50 per cent ferrosilicon has withdrawn from the market and the lowest current prices appear to be $85, delivered. A Chicago district melter has closed for 350 tons of 10 per cent Bessemer ferrosilicon.

We quote 80 per cent ferromanganese, $115.06, delivered; 50 per cent ferrosilicon, $85, delivered; spiegeleisen, 18 to 22 per cent, $45.05, delivered.

Pig Iron.—The market is quiet but firm. There are few larger inquiries and hardly any sales of size, although spot business is fairly active. Melters have not yet entered the market to any extent for second quarter, and while some first quarter tonnage is still unplaced, a considerable portion of it has been contracted for. An Indiana farm implement manufacturer is inquiring for 1200 tons of foundry and 500 tons of malleable for 60 days' shipment. Another Indiana melter wants 750 tons of foundry of 2.75 to 3.25 per cent silicon content, 200 tons for first quarter delivery and the remainder for second quarter shipment. A Wisconsin sanitary manufacturer is about to put out an inquiry for 1500 tons of foundry for second quarter delivery. After advancing its price to $27.50, delivered, Chicago, the Southern furnace making water and rail delivery withdrew from the market. Fully 30,000 tons of this iron was held in the Chicago district. The lowest remaining quotation on Southern foundry is $23, base, Birmingham, and a number of furnaces are quoting from 50c. to $2 higher. The minimum quotation on Southern iron for second quarter shipment is $25, base, Birmingham. No sales have been reported at that price, however. One Southern stack took 5000 tons at $24, base, Birmingham, for second quarter shipment and then withdrew from the market, later putting out a new quotation of $25. A considerable number of orders for charcoal averaging about 100 tons each have been booked and prices are firm at $30, furnace, with producers sold into April and May. Low phosphorus is quiet with the minimum quotation on domestic material $35.50, delivered, Chicago. Foreign low phosphorus is expected to advance in view of rising fuel costs in Great Britain. The Cranberry furnace in the South went in on low phosphorus Jan. 9. Silvery has been weak because of the competition of a Southern furnace, which has a freight advantage over Jackson County producers. This stack is now well sold ahead and the tendency is towards closer general observance of the Jackson prices. An Indiana automobile manufacturer has placed 2000 tons of 7 per cent silvery.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards or, when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.15
Northern coke, No. 1, sil. 2.25 to 2.75	$29.00 to 30.00
Northern coke, foundry No. 2, sil. 1.75 to 2.25	29.00 to 29.50
Malleable, not over 2.25 sil.	29.00 to 29.50
Basic	29.00 to 29.50
High phosphorus	29.00 to 29.50
Southern, No. 2	29.01 to 30.01
Low phos., sil. 1 to 2 per cent copper free	35.50 to 36.76
Silvery, sil. 8 per cent	40.29

Plates.—Demand continues to broaden and Chicago mills are turning away an increasing amount of business because they cannot make the deliveries desired. One local producer, in fact, has withdrawn from the market, being sold tight for this quarter and not yet having opened its books for second quarter. Railroad car buying is unabated and additional oil tank work has come into the market. Storage tank inquiries from the Pan-American Petroleum & Transit Co. and the Sinclair and Standard companies call for from 30,000 to 45,000 tons of plates. Buyers desiring early plate deliveries are placing more and more tonnage in the East. One large Eastern mill is still quoting 2c., base Pittsburgh, but a number of others are asking 2.10c. or more.

The mill quotation is 2.20c. to 2.30c., Chicago. Jobbers quote 2.90c. for plates out of stock.

Cast Iron Pipe.—Large inquiries are appearing and a considerable tonnage is being placed. At the same time, prices are growing stronger and an advance is believed to be imminent. While some orders are still being booked at $43 base, Birmingham, for 6-in. and larger, a number of sellers are now holding their product at from $1 to $2 higher. The United States Cast Iron Pipe & Foundry Co. has been awarded 2640 tons for St. Paul and 1000 tons for Duluth. The Milwaukee Gas Co. takes bids this week on 5000 tons of 4- to 16-in. pipe inclusive, while the Milwaukee Sewerage Commission will receive tenders Jan. 26 on 1725 tons of water pipe and specials. Cincinnati receives bids today on 1000 tons of 6- to 12-in. inclusive. Elmwood Park, Ill., takes bids Jan. 19 on 800 tons of 4- to 12-in. Lyons, Ill., will receive tenders from contractors Feb. 6 on 11,000 feet of 6-in. and 3600 feet of 4-in.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $55.20 to $57.20; 6-in. and above, $51.20 to $53.20; class A and gas pipe, $3 extra.

Rails and Track Supplies.—Small lots of track fastenings continue to be placed from time to time, but otherwise the market is featureless. Specifications continue to be liberal in both rails and track supplies.

Standard Bessemer and open-hearth rails, $43; light rails rolled from new steel, 2.15c., f.o.b. makers' mills.

Standard railroad spikes, 2.85c. to 3c. mill; track bolts with square nuts, 3.85c. to 4c., mill; iron tie plates, 2.50c.; steel tie plates, 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.50c. base and track bolts, 4.50c. base.

Wire Products.—Nails and plain wire are still on a double basis, as the leading producer has not yet advanced to the independent level. Mills are not concerned about getting additional business. Their present problem is to make the deliveries desired by buyers.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire and No. 9 and heavier bright basic wire, $3.30 per 100 lb.; common wire nails, $3.45 per 100 lb.; cement coated nails, $2.90 per keg.

Bars.—The pressure for soft steel bars is increasing rather than diminishing and because of deliveries more business is being diverted to Eastern mills. The sched-

ules of automobile manufacturers for the first half of this year calls for a 30 per cent increase in production. It is rather doubtful whether this goal will be attained in view of the growing scarcity of steel. Not only Chicago producers but mills east of here are heavily booked. One Eastern mill, in fact, has closed its books for first quarter. Farm implement manufacturers are growing more active and one leading company is reported to be running at 80 per cent of normal.

Mill prices are: Mild steel bars, 2.10c., Chicago; common bar iron, 2.35c. to 2.50c., Chicago; rail steel, 2c., Chicago mill.

Jobbers quote 2.80c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.80c. for rounds and 4.30c. for flats, squares and hexagons.

Jobbers quote hard and medium deformed steel bars at 2.50c. base; hoops, 4.15c.; bands, 3.55c.

Bolts and Nuts.—The market is firm at the September discounts and an early advance is predicted in some quarters. The Ford Motor Co. has closed for a 60 days' supply of nuts, and liberal specifications in nuts, bolts and rivets are being received from those automobile makers which placed contracts for first quarter.

Jobbers quote structural rivets, 3.75c.; boiler rivets, 3.85c.; machine bolts up to ⅞ x 4 in., 50 per cent off; larger sizes, 50 off; carriage bolts up to ⅞ x 6 in., 45 off; larger sizes, 45 off; hot pressed nuts, squares and hexagons, tapped, $2.75 off; blank nuts, $2.75 off; coach or lag screws, gimlet points, square heads, 55 per cent off.

Reinforcing Bars.—Activity in reinforcing steel which was sustained throughout the holiday season is expanding still further as the new year progresses. Awards are on the increase and new projects are more plentiful. A large tonnage of bars for road work is expected to be let during the annual good roads show which takes place at the Coliseum, Chicago, this week. Warehouse prices on concrete bars are still 2.50c. base, but advances are looked for by the close of the month.

State hospital, Brooklyn, N. Y., 450 tons, to Kalman Steel Co.

U. S. Veterans' Hospital, Chillicothe, Ohio, 400 tons, to Kalman Steel Co.

Storage bins for Oklahoma-Portland Cement Co., Ada, Okla., 400 tons, to LaClede Steel Co.

Elks' club building, Louisville, Ky., 300 tons, to Kalman Steel Co.

State road work, Missouri, 250 tons, to Corrugated Bar Co.

Thomas Jefferson junior high school, Cleveland, Ohio, 250 tons, to Kalman Steel Co.

Polk County, Iowa, highway work, 250 tons, to Concrete Steel Co.

Lyon oil refinery, Pearson, Ark., 125 tons, to Corrugated Bar Co.

State road work, Pittsburgh, Kan., 110 tons, to LaClede Steel Co.

Elevator for City of Norfolk, Va., 110 tons, to Concrete Steel Co.

Hancock, Mich., high school, 100 tons, to Corrugated Bar Co.

Pending work includes:

Gimbel Bros. store addition, Milwaukee, Wis., 800 tons.

Three highway bridges, Glencoe, Ill., 200 tons, general contract awarded to George Sheldon, Dubuque, Iowa.

Latin Quarter building, Chicago, 170 tons, figures being taken by Marshall & Fox, architects.

The 1400 Building Corporation apartment, 1400 Lake Shore Drive, Chicago, 150 tons.

Power station for Public Service Co. of Northern Illinois, Waukegan, Ill., 100 tons, Bates & Rogers, contractors.

Rome Brass & Copper Co. plant, Chicago, 100 tons.

Steel Castings.—The announcement that the Pennsylvania will build and buy 300 locomotives means that considerable work will go to Eastern foundries which have not been so busy as Western plants in view of the preponderance of railroad equipment buying in the West. Over 13,000 tons of steel castings are involved in these engines. Railroad car builders continue to postpone the purchase of miscellaneous castings for cars on their books. Between 20,000 and 25,000 tons of this class of castings are pending. The tendency of prices is toward greater firmness.

Sheets.—Not only are local mills sold tight for this quarter but a number of outside producers have also reached that point or are close to it. A year ago, American mills took considerable Japanese tonnage which helped tide them over a period of exceptionally light buying. Today they show little interest in business from that country. A current inquiry from Japan calls for 25,000 tons of light gage black sheets for second quarter delivery.

Mill quotations are 3.35c. to 3.50c. for No. 28 black, 2.50c. to 2.75c. for No. 10 blue annealed and 4.35c. to 4.50c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight rate to Chicago of 34c. per 100 lb.

Jobbers quote f.o.b. Chicago, 4c. for blue annealed, 4.85c. for black and 5.85c. for galvanized.

Structural Material.—Fabricating awards during the past week were few. This decline in lettings is not regarded as significant, however, in view of the large volume of business which is at the point of being closed. Plain material is increasingly difficult to obtain from local sources except for extended delivery. One important Chicago mill has now sold its entire first quarter output and is not yet quoting on second quarter. Eastern mills are commencing to get important tonnages in this territory. A Milwaukee fabricator has placed 2100 tons for a Missouri bridge for rolling in the East. At least one leading Eastern producer is quoting 2c., Pittsburgh, on plain material, but a number of others are asking more.

The mill quotation on plain material is 2.20c., Chicago. Jobbers quote 2.90c. for plain material out of warehouse.

Coke.—The local producer of by-product foundry coke has orders which would warrant the heaviest shipments in history this month. Whether the tonnage can actually be shipped is doubtful in view of present operating difficulties. Car shortage at the mines and delays of cars in transit make it necessary to purchase considerable coal in the open market with the result that it is difficult to control mixtures. The price of local foundry coke is unchanged at $15, delivered in Chicago switching district. Connellsville foundry is stronger at $9 to $10, ovens, and is increasingly scarce. The freight from Connellsville is $4.16.

Old Material.—Owing to the highly speculative character of the market and the dearth of consumer buying, it is difficult to ascertain ruling prices. There is considerable variation in the prices paid by brokers as is to be expected in a strong bull movement. So far as users are concerned, however, the appended quotations are almost entirely nominal and there is some doubt whether they will have to pay those prices when they re-enter the market. They continue to draw on their scrap reserves in the hope of outwaiting the dealers and in the meantime holders of scrap show an increasing inclination to unload at the present market. This is true not only of local stocks but of country supplies which are now being offered from considerable distance. A sale of 500 tons of busheling for shipment from Kansas City is typical. It remains to be seen, however, whether these offerings will be in sufficient volume to affect the market materially.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$23.00 to $23.50
Cast iron car wheels	27.00 to 27.50
Relaying rails, 56 and 60 lb.	26.00 to 27.00
Relaying rails, 65 lb. and heavier	32.00 to 35.00
Rolled or forged steel car wheels	25.00 to 25.50
Rails for rolling	20.50 to 21.00
Steel rails, less than 3 ft.	22.50 to 23.00
Heavy melting steel	19.25 to 19.75
Frogs, switches and guards cut apart	19.25 to 19.75
Shoveling steel	18.75 to 19.25
Drop forge flashings	15.00 to 15.50
Hydraulic compressed sheets	16.50 to 17.00
Axle turnings	16.75 to 17.25
Per Net Ton	
Iron angles and splice bars	23.00 to 23.50
Steel angle bars	19.00 to 19.50
Iron arch bars and transoms	23.00 to 23.50
Iron car axles	26.00 to 26.50
Steel car axles	20.00 to 20.50
No. 1 busheling	16.00 to 16.50
No. 2 busheling	10.50 to 11.00
Cut forge	17.00 to 17.50
Pipe and flues	13.00 to 13.50
No. 1 railroad wrought	18.00 to 18.50
No. 2 railroad wrought	17.00 to 17.50
Steel knuckles and couplers	22.50 to 23.00
Coil springs	23.00 to 23.50
No. 1 machinery cast	21.50 to 22.00
No. 1 railroad cast	20.00 to 20.50
No. 1 agricultural cast	20.00 to 20.50
Low phos. punchings	19.00 to 19.50
Locomotive tires, smooth	18.50 to 19.00
Machine shop turnings	12.00 to 12.50
Cast borings	14.00 to 14.50
Stove plate	18.00 to 18.50
Grate bars	18.00 to 18.50
Brake shoes	18.50 to 19.00
Railroad malleable	22.75 to 23.25
Agricultural malleable	22.75 to 23.25

New York

Steel Prices Higher—Large Tin Plate Inquiry —Many Embargoes

NEW YORK, Jan. 16.—Owing to snow storms, the railroads have declared numerous embargoes, and pig iron is being moved with extreme difficulty, especially to New England, where the New Haven has embargoed all coke and pig iron shipments. Embargoes have also been issued by the New York Central, Central of New Jersey and the Lehigh Valley, and permits for shipments can be obtained only with difficulty. Hence, the movement is very slow and the melters are making many complaints. Sales have been of moderate volume, but prices are firm. The American Locomotive Co. has purchased 200 tons of charcoal iron for its Schenectady plant, but has not closed for the 2000 tons of foundry iron for Dunkirk, for which it has been inquiring. The American Car & Foundry Co. has purchased 1000 tons of malleable in eastern Pennsylvania, and the Pardee Steel Corporation, 1000 tons of basic, the latter at $27 furnace. The Worthington Pump Co. is inquiring for 2000 tons of foundry grades for the first half of the year and the American Chain Co. is in the market for from 650 to 700 tons for first quarter for delivery at York, Pa. A Connecticut melter is in the market for 1000 tons for spot delivery. A sale of 1000 tons for first quarter has been made on a basis of $27.25, Buffalo, but $28, Buffalo, is more frequently quoted. This sale, which was not made by a Buffalo furnace, would figure $28.50, eastern Pennsylvania, but $28 is the prevailing quotation. A sale of 500 tons of No. 2X to a jobbing foundry was made on a basis of $28 for No. 2 plain, or $29 for No. 2X. An interesting development has been an inquiry of 2000 tons for export on which at least one seller quoted on the basis of $29, furnace, for No. 2 plain. It is considered probable that complications resulting from the occupation of the Ruhr Valley by the French will curtail shipments of French and other Continental irons and that more opportunity may be given for exporting irons to some countries which have been buying from France, Belgium and Germany.

We quote delivered in the New York district as follows, having added to furnace prices $2.27 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.44 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$32.27
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	31.27
East Pa. No. 2 fdy., sil. 1.75 to 2.25	30.27
Buffalo, sil. 1.75 to 2.25	31.91
No. 2X Virginia, sil. 2.25 to 2.75	33.44
No. 2 Virginia, sil. 1.75 to 2.25	32.44

Cast Iron Pipe.—Prices continue strong and private buying constitutes a large part of present business. There is nothing new in municipal tenders in this district, but it is reported that the City of New York will probably be in the market in a few weeks for as much as 20,000 tons of water pipe. Bids were opened Jan. 16 on a small contractor's inquiry for 800 tons of 12-in., 16-in. and 20-in. pipe. We quote per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $54.50; 4-in. and 5-in., $59; 3-in., $64.80, with $4 additional for Class A and gas pipe. The soil pipe market is strong with continued activity on the part of jobbers. Prices are firm and companies report a considerable tonnage of orders booked at the new discounts. Discounts of both Southern and Northern makers, delivered New York, are as follows: 2 to 6-in. standard, 23 to 25¾ per cent off list; heavy, 33 to 35¾ per cent off list.

Ferroalloys.—Another advance in the price of ferromanganese by British producers has been announced, the quotation now standing at $107.50, seaboard, duty paid, and American producers have followed suit. No sales are yet recorded at the new price, but some business has been done at the former price of $102.50, and there is still some inquiry before the market. Sentiment is optimistic and further buying is expected, in view of the heavy steel output. The spiegeleisen market is moderately active at unchanged prices. One large independent producer is inquiring for 5000 tons for consumption at one of its subsidiary plants. The 50 per cent ferrosilicon market is exceedingly strong, with one producer well booked as to its total output. While contracts can be negotiated for this year's consumption over a range of $82.50 to $87.50, delivered, carload and other business cannot be booked at less than $85 to $90, delivered. The ferrochrome market is reported as active and strong. Quotations are as follows:

Ferromanganese, domestic, furnace, per ton	$107.50
Ferromanganese, British, 80 per cent, f.o.b. Atlantic port	$107.50
Spielgeleisen, 17 to 19 per cent, furnace,	$34.00 to $36.00
Spielgeleisen, 20 per cent, furnace or duty paid	$33.00 to $35.00
Ferrosilicon, 50 per cent, delivered, per gross ton, carloads	$85.00 to $90.00
Ferrotungsten, per lb. of contained metal,	90c. to 95c.
Ferrochromium, 4 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	13c to 14c.
Ferrovanadium, per lb. of contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, in carloads, per net ton	$200.00

Ores

Manganese ore, foreign, per unit, c.i.f.	29c. to 30c.
Tungsten ore, per unit, in 60 per cent concentrates, nominal	$7.50 to $8.50
Chrome ore, basic 48 per cent Cr_2O_3, crude per ton, c.i.f. Atlantic seaboard	$18.00 to $28.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	60c. to 70c.

Finished Iron and Steel.—As forecasted in this column a week ago, two or more steel companies have led the way in an advance in prices of plates, shapes and bars. The Midvale Steel & Ordnance Co., on Thursday, announced an advance to 2.10c., Pittsburgh, on all three commodities, but is quoting this price only on large lots, and for small lots its quotations range from 2.15c. to 2.25c. A central Pennsylvania plate mill likewise advanced plates to 2.10c., Pittsburgh, early last week, with higher prices for small lots, but late in the week withdrew all quotations. It is predicted that the largest independent interest will advance plates, shapes and bars within a week or two. Orders are coming to local sales departments of steel companies at a very good rate. In some lines there is indifference among makers toward new business. This is particularly true of tin plate. The Standard Oil Co. of New Jersey has come into the market for 450,000 base boxes, 150,000 for second quarter and 300,000 tons for the last half. All of the independent wire makers have now advanced prices to the basis of 2.70c. per lb., Pittsburgh, for wire nails. The American Steel & Wire Co. has not followed this advance, but as it is well sold ahead, it is not of much influence in current business for early delivery. Demand for structural steel keeps up at an amazing rate, oil tanks being a conspicuous part of current and prospective business. The Equitable Building at Seventh Avenue and Thirty-second Street, New York, has again come into the market, and will require from 18,000 to 20,000 tons of steel. Another job which has been up before is the Roosevelt Hotel, New York, which will require about 8000 tons of steel. Other work now pending gives a total of more than 30,000 tons of steel work now up for bids for New York City construction alone. The Sinclair Consolidated Oil Corporation has just let tanks requiring 7500 tons of plates and is in the market for 30 more tanks requiring 8700 tons.

We quote for mill shipments New York delivery, as follows: Soft steel bars and steel shapes, 2.34c. to 2.44c.; structural plates, 2.34c. to 2.44c.; bar iron, 2.34c.

High Speed Steel.—The market is stated to be considerably improved, but prices continue unchanged, producers generally quoting 75c. to 80c. per lb. on 18 per cent tungsten high speed steel, with special brands of some companies ranging up to 90c. per lb.

Warehouse Business.—The situation is unchanged from last week. Business continues fair in most lines, with sales of structural material on a small scale owing to the season. The sheet market is still weak, black sheets generally selling on a basis of 4.50c. per lb., and galvanized on a basis of 5.25c. to 5.50c. per lb. Brass and copper warehouses report fair activity and no change in prices since December. The demand for small sizes of steel pipe is good. We quote prices on page 268.

Coal and Coke.—The coal and coke situation is again tightening and prices are about 50c. higher, with $8.50 to $9 quoted on furnace coke and $9.50 to $10 on foundry. By-product is still quoted at $14.84 to $14.91, Newark and Jersey City points. Owing to an accumulation at piers, steam coal is somewhat lower than mine prices would indicate. Owing to railroad conditions, many shippers are far behind in deliveries. The Pennsylvania Railroad has issued an embargo against delivery of coal into Buffalo and this, it is feared, will embarrass blast furnace operations in that city.

Old Material.—The tendency of the market is still upward, but the number of new contracts being made is smaller than recently. The heaviest shipments are to western Pennsylvania mills and from $21.50 to $22 per ton delivered is being paid for No. 1 heavy melting steel of railroad quality or equivalent. Eastern Pennsylvania is quiet, shipment to Pottsville on an old order at $17 per ton being the latest sale reported in that district. No. 1 heavy melting steel is now quotable here at from $15.50 to $16 per ton and railroad quality at $16.25 to $16.75 per ton. Stove plate is strong, with several New Jersey foundries paying prices which justify a buying price New York of $14 to $14.50. Specification pipe is now quoted at from $12.75 to $13.25. As high as $19.50 per ton is now being paid for delivery to Bethlehem on railroad grade of heavy melting steel.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$15.50 to $16.00
Steel rails, short lengths, or equivalent	16.25 to 16.75
Rails for rolling	17.50 to 18.00
Relaying rails, nominal	26.00 to 27.00
Steel car axles	19.00 to 19.50
Iron car axles	25.00 to 26.00
No. 1 railroad wrought	17.00 to 17.50
Wrought iron track	16.25 to 16.75
Forge fire	11.50 to 12.00
No. 1 yard wrought, long	15.50 to 16.00
Cast borings (clean)	13.50 to 14.00
Machine-shop turnings	13.50 to 14.00
Mixed borings and turnings	13.50 to 14.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.75 to 13.25
Stove plate	14.00 to 14.50
Locomotive grate bars	14.00 to 14.50
Malleable cast (railroad)	15.00 to 15.50
Cast-iron car wheels	18.00 to 18.50

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$22.00 to $23.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	19.00 to 20.00
No. 1 heavy cast, not cupola size	17.00 to 18.00
No. 2 cast (radiators, cast boilers, etc.)	17.00 to 18.00

Buffalo

Higher Quotations on Pig Iron—Strong Demand for Finished Materials

BUFFALO, Jan. 16.—Stronger prices are more in evidence as some of the sellers come forward with the announcement they are sold up for first quarter. The Bethlehem Steel Co. district office is unable to consider any more merchant iron for the period; second quarter business has not yet been accepted by any Buffalo factor. Inquiry has been quiet in comparison with recent activity though some producers are certain that foundry needs have not been fully satisfied. The $28 base for No. 2 plain iron is now the absolute low price of several sellers; malleable has been quoted at $29 by one furnace.

We quote f.o.b. per gross ton Buffalo as follows, the higher price being for early shipment:

No. 1 foundry, 2.75 to 3.25 sil.	$29.00 to $30.00
No. 2X foundry, 2.25 to 2.75 sil.	28.00 to 28.50
No. 2 plain, 1.75 to 2.25 sil.	27.00 to 28.00
Basic	27.00
Malleable	28.00
Lake Superior charcoal	33.28

Finished Iron and Steel.—Demand for all products except structural shapes and plates continues as strong in the early days of January as marked the close of 1922; prices are stronger and the scattered quotations of less than 2c. on bars seem to have been withdrawn entirely. Bar tonnages range from 50 to 200 tons and all sellers have comfortable tonnages on the books. No second quarter selling is recorded, although "feelers" have been put out by a few consumers. Bar demand is from a diversified list of users; much of it is from the automotive trade, but buyers for railroad equipment and agricultural implements are very active. Two important factors in bar sales have withdrawn from the market because of the large tonnages now on the books. One of these agencies has also withdrawn on galvanized sheets and pipe; black sheets are available only in limited quantities. The leading agency for wire and tinplate has withdrawn on these products in the face of a big demand. This seller will be unable to consider tinplate for first half delivery. The entire situation is one of production and delivery rather than selling.

We quote warehouse prices, Buffalo, as follows: Structural shapes, 3.20c.; plates, 3.20c.; soft steel bars, 3.10c.; hoops, 4.10c.; bands, 3.90c.; blue annealed sheets, No. 10 gage, 4.05c.; galvanized steel sheets, No. 28 gage, 5.85c.; black sheets, No. 28, 4.85c.; cold rolled round shafting, 3.95c.

Old Material.—Sales of heavy melting steel at $21 and $21.50 have been made, but no great tonnages have been brought out, dealers holding to their policy of waiting for $22 or more. All the mills are interested and ready to buy. Stocks are extremely low. The market in all products is strong.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$21.00 to $21.50
Low phos., 0.04 and under	23.00 to 23.50
No. 1 railroad wrought	18.00 to 19.00
Car wheels	22.00 to 23.00
Machine-shop turnings	14.50 to 15.50
Cast iron borings	17.00 to 17.50
Heavy axle turnings	18.50 to 19.50
Grate bars	18.00 to 18.50
No. 1 busheling	19.00 to 19.50
Stove plate	19.00 to 19.50
Bundled sheet stampings	15.50 to 16.00
No. 1 machinery cast	22.50 to 23.50
Hydraulic compressed	19.00 to 20.00
Railroad malleable	23.00 to 23.50

Birmingham

Interest Now Centers in Pig Iron Buying for Second Quarter

BIRMINGHAM, ALA., Jan. 15.—All Alabama makers, being on easy street so far as first quarter iron is concerned, interest attaches to second quarter delivery. One small maker sold 5000 tons for that delivery at the base of $24 and went out of the market for the time being, having only one stack active. Another small maker booked a like amount of iron last week for second quarter at $25. This maker also operates one stack at this time. The price was paid with apparent conviction that better could not be done. The largest foundry maker is holding for $25 for second quarter and the next largest and still another have not opened for second quarter, but confidently expect a base of $24 minimum and rather look for $25 to be general. The 25,000 tons booked in Chicago is due to come from two furnaces in northern Alabama, which, from a freight standpoint, are a separate Alabama district and enjoy besides an advantage of $2 a ton by river and rail connections with the Burlington at Metropolis. It follows that special rates made on northern Alabama iron do not affect the Birmingham iron market. All manner of consumers have been in the market with makers of heating apparatus especially active. Cincinnati, St. Louis and Chicago alike have taken considerable tonnage recently. In that tonnage were irons sold at $24 and $25. The No. 1 furnace of the Tennessee company, which was rebuilt for 550 tons capacity, has made runs of 625, 626 and 637 tons. The Tennessee company will blow in a fourth stack at Bessemer at an early date and the Alabama Co. reiterates intention of blowing in a second stack at Gadsden Feb. 1. The market is apparently very strong and the $23 still charged for the remainder of the first quarter seems about to disappear for higher levels. The January make will be larger than December. Car movements are all that could be desired for outgoing products.

We quote per gross ton f.o.b. Birmingham district furnaces as follows:

Foundry, silicon 1.75 to 2.25	$23.00 to $24.00
Basic	22.00 to 23.00
Charcoal, warm blast	32.00

Finishing Mills.—Mills of the Tennessee company and the independent producers are on a continuously full turn. There has been an unusually heavy business in sheets and steel pipe in the Southeast lately and Youngstown mills have done a good business at New Orleans. Structural steel mills are near capacity and tank builders have all they can do.

Cast Iron Pipe.—There has been a lull in the sanitary pipe trade following buying that calls for capacity production for some time. The base remains at $60. Pressure pipe is becoming more active with large business in sight. The United States Cast Iron Pipe & Foundry Co. has booked 1000 tons for Duluth. The base for 4 and 6-in. sizes has been raised to $44 and it looks as if that will become base for larger sizes soon.

Coal and Coke.—Alabama coal production for the year ran 16,600,000 tons, an increase of 25 per cent. The increase is principally due to greater iron and steel production and partly to the Western emergency demand in July and August. Large tonnages of by-product coke are going to Chicago and much to Detroit and Iowa points. Spot coke is bringing as high as $9.

Old Material.—The scrap market is firm and both steel and cast have been fairly active. Steel scrap is bringing the full quoted price. Marking up is expected, but has not yet been done.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$16.00 to $17.00
No. 1 steel	14.00 to 16.00
No. 1 cast	18.00 to 20.00
Car wheels	18.00 to 20.00
Tramcar wheels	17.00 to 19.00
Stove plate	16.00 to 17.00
Cast-iron borings	9.00 to 10.00
Machine shop turnings	9.00 to 10.00

Boston

Northern Furnaces Place Fair Tonnage for First Quarter Delivery

BOSTON, Jan. 16.—Sales of pig iron in this territory the past week ran close to 10,000 tons, first quarter delivery. Northern furnaces took the bulk of the business. A Worcester, Mass., foundry is reported to have bought two lots of Northern silicon 1.75 to 2.25, one at around $30.91, delivered, and the other about 35c. a ton cheaper, the total approximating 2000 tons, as well as smaller tonnage of eastern Pennsylvania high silicon at $27 furnace base, and about 1600 tons of lake charcoal at around $30 furnace base, the last for mixture with foreign iron previously purchased. It is claimed this foundry's losses in foreign iron castings have run as high as 25 per cent. Between 1000 and 2000 tons of northern malleable went to another Worcester melter at around $28 furnace. Other sales included 600 tons eastern Pennsylvania malleable, 500 tons northern, silicon 2.25 to 2.75, and smaller tonnages of No. 2 plain and No. 1 X, eastern Pennsylvania at $27 to $30 furnace base, and unimportant tonnages of western Pennsylvania, Buffalo, Alabama and Scotch. Of the several inquiries in the market, 1000 tons of No. 2 X, February and March delivery, wanted by a Taunton, Mass., stove maker, and 600 tons No. 2 X or No. 1 X, second quarter or earlier shipment, wanted by a Worcester, Mass., textile interest, are among the largest.

We quote delivered prices on the basis of the latest reported sales, now infrequent, and as follows, having added to furnace prices $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia and $9.60 from Alabama:

Eastern Penn., sil. 2.25 to 2.75	$31.15 to $33.15
Eastern Penn., sil. 1.75 to 2.25	30.65 to 32.65
Buffalo, sil. 2.25 to 2.75	31.91 to 33.91
Buffalo, sil. 1.75 to 2.25	30.91 to 32.91
Virginia, sil. 2.25 to 2.75	33.42 to 34.42
Virginia, sil. 1.75 to 2.25	32.92 to 33.92
Alabama, sil. 2.25 to 2.75	34.10 to 35.10
Alabama, sil. 1.75 to 2.25	33.60 to 34.60

Iron Importations.—Two moderately large cargoes of foreign iron arrived at this port during the week ending Jan. 13, one of 4071 tons of German and one of 4392 tons of English. In addition, another lot of 500 tons of English foundry iron was received, as well as 230 tons of English spiegeleisen. Thus the aggregate receipts for the week were 9193 tons, contrasted with (corrected) 3450 tons for the previous week. The previous week's importations consisted of 2700 tons of Scotch and 750 tons of Belgian iron.

Finished Material.—No large tonnages of structural steel for construction purposes were closed the past week, but mills nevertheless booked a large aggregate tonnage for fabricators' stocks. Plates sold well, mostly at 2c., Pittsburgh, and slightly higher. Bookings of billets and blooms were larger than for any similar period in months, and bookings and specifications of bars established a new high record for the new year. Sheets and tin plate also were active. A sale of 700 tons of galvanized sheets at 4.35c., Pittsburgh, is reported, but most other transactions were at 4.50c. Tonnages of tool steel placed in this district were unusually heavy, and sales of bolts and nuts were fully 50 per cent larger than for the previous week. Steel castings and forgings are comparatively quiet. Aggregate bookings of finished material in New England were more than 100 per cent larger than for the previous week and approximately 150 per cent larger than for the week before that.

Warehouse Business.—The movement of iron and steel out of warehouses was decidedly limited the past week, because of weather conditions. Warehouses, however, have a fairly sizable accumulation of business on their books, not only for iron and steel, but for bolts, nuts, nails, horseshoe supplies, and, in fact, nearly everything. Local supplies of ⅝-in. bolts and smaller are dwindling fast. The discount on semi-finished brass nuts is now 33 1/3 per cent, contrasted with 40 per cent heretofore. Wire nails have been advanced 10c. per keg. Galvanized nails are almost unobtainable, and mills are still unwilling to accept orders for them because of the backwardness in deliveries of common wire stock.

Jobbers quote: Soft steel bars, $3.065 per 100 lb. base; flats, $3.85; concrete bars, 3.16½c.; structural steel, $3.065 to $3.50; tire steel, $4.50 to $4.85; open-hearth spring steel, $5 to $6.50; crucible spring steel, $12; steel bands, $4.25; hoop steel, $4.75; cold rolled steel, $4 to $4.50; refined iron, $3.065; best refined iron, $4.50; Wayne iron, $5.50; Norway iron, $6.60 to $7.10; plates, 3.16½c. to $3.35; No. 10 blue annealed sheets, $4.15 per 100 lb. base; No. 28 black sheets, $5.40; No. 28 galvanized sheets, $6.40.

Coke.—The coke situation remains practically unchanged. Spot business is largely confined to 48-hr. Connellsville foundry coke, the delivered price of which is around $16, and additional sales of this grade coke to retail coal dealers are noted. Both the New England Coal & Coke Co. and the Providence Gas Co. apparently are not anxious for new business, both concerns being well sold ahead and still behind on deliveries due to the semi-demoralized transportation situation the past week. The New England company continues to quote $16 delivered within the $3.10 freight zone, and the Providence Gas Co., $15 delivered.

Old Material.—Heavy snows experienced the past week, making transportation of old material practically out of the question, together with a real scarcity of scrap, curtailed actual sales. Prices, however, appear stronger, although in only a few instances have they actually advanced. Chemical cast iron borings are again the strongest thing on the list of old materials. Most dealers are offering $17 to $17.50 for these, but sales of at least two cars at $18 are reported. For borings suitable for steel mill purposes $13 and $13.50 a ton on cars shipping point has been paid by dealers. Machine shop turnings, free from bushings, command $12.50, and mixed borings and turnings $12 to $12.50, but they are difficult to obtain. Prices offered by dealers for heavy melting steel take a wide range, depending on the nature of the material and the point of consumption. The best price offered is $16 on cars shipping point. This applies to selected stock for the Pittsburgh district. Eastern Pennsylvania mills will accept less desirable stock, the range of offered prices being $15 to $15.75 in this case, while common yard heavy melting steel has been purchased for as little as $14. For the ordinary run of heavy melting steel, however, $15.50 to $16 appears to be the general range of prices. Horseshoes are wanted at $18 shipping point or $23 delivered and forged fire scrap at

$9.50 to $10 on cars shipping point. In fact, the market here is well filled with desired tonnages of practically all old material and when weather conditions permit an active market with an upward tendency in prices is assured.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$22.00 to $22.50
No. 2 machinery cast	20.00 to 20.50
Stove plate	16.50 to 17.00
Railroad malleable	21.50 to 22.00
Bundled sheets	14.00 to 14.50
Car wheels	20.00 to 21.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$15.50 to $16.00
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	11.00 to 11.50
Wrought pipe (1-in. in diam., over 2 ft. long)	10.50 to 11.00
Machine shop turnings, free of bushings	12.00 to 12.50
Machine shop turnings, regular	11.50 to 12.00
Cast iron borings, rolling mill	13.00 to 13.50
Cast iron borings, chemical	17.00 to 17.50
Blast furnace borings and turnings	12.00 to 12.50
Bundled forged scrap	11.00 to 11.50
Regular forged scrap and bundled skeleton	11.00 to 11.50
Axles	20.00 to 20.50
Shafting	20.00 to 21.00
Rails for rolling	15.00 to 15.50

Cincinnati

Price Trend of Southern Iron Upward for Second Quarter

CINCINNATI, Jan. 16.—Further evidence is seen of the advancing tendency in prices of Southern iron, and only two interests are now making a price of $23, Birmingham, for either first or second quarters. Second quarter business is now being solicited at $25 by a number of companies, but as yet little tonnage for this delivery has been placed at this price. However, several sales have been reported at $24, Birmingham base. We note one sale of 1000 tons to an Indianapolis melter, shipment to run through April at $23, and one of 1000 tons to a Michigan automobile manufacturer for prompt shipment at the same figure. A Louisville stove maker is reported to have placed an order for 500 tons for prompt shipment at $23.50. Some resale southern Ohio iron appeared in the market last week, and as a result prices were inclined to be somewhat soft. A number of 500-ton lots were sold, and on part of this tonnage, in highly competitive territory, it is said prices were shaded 25c. a ton, or to $27.25, Ironton. There was some activity in silveries, the largest sale reported being 1000 tons to a northern Ohio stove shop. A number of sales running up to 300 tons were made. It is expected that prices on silvery irons will shortly be advanced about $2 a ton. A Southern maker of ferrosilicon is reported to have advanced its price $5 a ton. There is little inquiry and most of the deals going through are the result of solicitation by salesmen. A Michigan foundry wants 500 tons of Southern and a Columbus melter is in the market for 300 tons of foundry for second quarter. Norton furnace at Ashland will blow in this week.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$27.05
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	27.55
Ohio silvery, 8 per cent	37.77
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	29.77
Basic Northern	29.27
Malleable	29.77

Finished Material.—There is a very brisk demand for bars, shapes and plates and while the tonnages are not large, running usually from carloads to lots of 200 tons, the aggregate tonnage placed to date this month is fully up to the total placed for a similar period for many years past. The leading interest is reported to have advanced prices on shapes and plates $2 per ton to 2.10c., and a number of independent companies are also quoting this price. Bars continue to be quoted at 2c., and this is rather surprising, as the demand for bars is heavier than for other products. Some mills have declined further tonnage for first quarter bars. On sheets also business is brisk, and some second quarter contracting is reported to be going on, the Steel Corporation's subsidiary booking orders at prices now prevailing for first quarter. Independent companies, however, are not disposed to book for second quarter at prevailing prices, as they feel that, with mounting costs, sheets will be at least $3 per ton higher. Some of the independents have not booked orders for galvanized sheets at less than 4.50c., and are not extremely anxious to book even at this figure. The demand for wire and wire nails is showing much improvement, and the recent advance of $2 per ton is being firmly maintained. What the American Steel & Wire Co.'s attitude will be on the price situation is the subject of speculation in the trade, the majority opinion being that it will follow the market. Considerable activity is expected to develop shortly in the building line, as plans are now being prepared for a number of new hotels, office buildings and factories in the Cincinnati district. The bars for the Schmidt Realty Co.'s office building, Cincinnati, about 500 tons, have been awarded to the Bourne-Fuller Co. An inquiry for 400 tons is current for the Donaldson Lithographing plant at Norwood. The War Memorial Building at Nashville, Tenn., taking 900 tons of steel, bids on which were opened Jan. 10, will probably be awarded to a large New York general contractor, as its bid is considered the most attractive. The Meyer-Kiser Bank Building, Indianapolis, 450 tons, has been awarded to the Insley Mfg. Co. The Big Four Railroad, which opened bids last week on approximately 2000 tons of plates and shapes, will probably close this week. Bids on this order ran uniformly on a 2c., Pittsburgh, basis.

Warehouse Business.—Local jobbers report the demand for bars, shapes and plates steadily improving, and reinforcing bars also are very active. Jobbers of wire products also report satisfactory orders for spring shipment. Prices are firming up, and advances are likely to develop within the next two weeks.

Cincinnati jobbers quote: Iron and steel bars, 2.95c. base; reinforcing bars, 3.05c. base; hoops, 4.05c. base; bands, 3.85c. base; shapes and plates, 3.05c. base; cold-rolled rounds, 3.75c. base; cold-rolled flats squares and hexagons, 4.25c. base; No. 10 blue annealed sheets, 4c.; No. 28 black sheets, 4.70c.; No. 28 galvanized sheets, 5.75c.; No. 9 annealed wire, $3.10 per 100 lb.; common wire nails, $3.20 per keg, base.

Tool Steel.—With manufacturing operations showing a slight increase, the demand for tool steels is also showing improvement, and some fair-sized orders for both carbon and high speed steel were placed last week. Prices are unchanged, 18 per cent tungsten high speed steel being quoted at 75c. per lb., with special brands of some companies at 90c.

Coke.—The coke market, while still active as regards domestic fuel, is showing signs of weakness. Connellsville foundry coke is available today at $8.50, with furnace commanding the same price. New River foundry is unchanged at $11 to $12, Wise County foundry at $9, and furnace at $7.75. No changes are reported in by-products prices, which continue at $11, Connellsville basis.

Old Material.—A mixed situation has developed in the scrap market. Some dealers are of the opinion that prices will continue to advance, while others declare the market as a whole is weaker. The local market is showing little activity, and steel plants in the district are buying lightly. Cast grades are in fair demand. Prices on the whole show no change, and last week's quotations generally rule. The C. & O. has issued a fair sized list and the N. & W. is closing on a tonnage this week.

We quote dealers' buying prices, f.o.b. cars Cincinnati:

Per Gross Ton	
Bundled sheets	$13.00 to 13.50
Iron rails	17.00 to 17.50
Relaying rails, 50 lb. and up	26.00 to 27.00
Rails for rolling	18.00 to 18.50
Heavy melting steel	17.50 to 18.00
Steel rails for melting	16.00 to 16.50
Car wheels	19.50 to 20.00
Per Net Ton	
No. 1 railroad wrought	15.00 to 15.50
Cast borings	11.50 to 12.00
Steel turnings	11.00 to 11.50
Railroad cast	17.00 to 17.50
No. 1 machinery cast	20.00 to 20.50
Burnt scrap	11.50 to 12.00
Iron axles	20.50 to 21.00
Locomotive tires (smooth inside)	15.00 to 15.50
Pipes and flues	11.00 to 11.50

Cleveland

Pig Iron Prices Strong — Finished Material Demand Active

CLEVELAND, Jan. 16.—Ore men are looking for a good season during 1923 with considerable gain in shipments over last year. With present pig iron production, stocks of ore on docks and in furnace yards May 1 will probably be less than at the same time during the two previous years. Based on estimated pig iron production during the first quarter, the amount of ore on docks and in furnace yards May 1 will be approximately 20,500,000 tons as compared with normal average of 20,000,000 tons during the past few years. The amount on docks and in furnace yards May 1 was 23,091,560 gross tons in 1922, 27,595,477 tons in 1921 and 18,152,555 tons in 1920. With improved conditions in the iron and steel industry, it is expected that ore prices will be named and a buying movement will start early this year, probably not later than March, provided a coal strike is avoided. In case a coal strike is declared, the opening of the ore market probably will be delayed. Last year prices were not named until June.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $5.95; Old range non-Bessemer, 51½ per cent iron, $5.20; Mesabi Bessemer, 55 per cent iron, $5.70; Mesabi non-Bessemer, 51½ per cent iron, $5.05.

Pig Iron.—The market is dull and firm, but with no further price advances. There was some small lot buying during the week by the smaller foundries, but large consumers generally are covered for the first quarter. One producer reports sales aggregating 5000 tons, including a 1000-ton lot taken by a northern Ohio foundry. Furnaces generally are comfortably filled with first quarter contracts and are not inclined to take on second quarter business at present. Few inquiries have come out for that delivery. Local foundry iron is still quoted at $27 for out of town shipment and $27.50 at furnace for Cleveland delivery, but $28 has been quoted on local inquiries for car lots and as the Cleveland price is now lower than in surrounding districts, a 50c. price advance here is probable. In the Mahoning Valley, small lot sales of foundry iron are reported at $28 and the minimum price now appears to be $27.50. Quotations by lake furnaces outside of Cleveland generally range from $27.50 to $28, although one producer sold 400 tons to a western Ohio foundry at $28.50 and made a few small lot sales at the same price. The only inquiries of any size are two from Indiana melters, each for 500 tons. Steel making iron is inactive. A number of sales of Southern foundry iron for the first quarter were made during the week, the price being unchanged at $23. Several inquiries are pending for low phosphorus iron including one for 1000 tons, and one for 750 tons.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron includes a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and a $6 rate from Birmingham.

Basic, Valley furnace	$27.00
Northern No. 2 fdy., sil. 1.75 to 2.25	28.00
Southern fdy., sil. 1.75 to 2.25	29.00
Malleable	28.00
Ohio silvery, nominal, sil. 8 per cent	38.52
Standard low phos., Valley furnace	35.00

Bolts, Nuts and Rivets.—Bolt and nut makers are getting a good volume of specifications on contracts. Some manufacturers have been making concessions up to 5 per cent on orders for immediate delivery, but it is claimed that this weakness has disappeared. However, jobbers and large consumers are being quoted 10 per cent below regular discounts. Rivet prices are being shaded $1 to $2 a ton for immediate specifications, but makers are holding to regular prices for first quarter contracts. Small rivets are still very irregular, the extreme discount being 70 per cent off list.

Finished Iron and Steel.—The demand for steel bars, plates and structural material, which started out well the first week of the year, has become heavy. Manufacturers in various lines are increasing their production schedules in anticipation of a better volume of business during 1923, and because of stiffening prices and slow deliveries are placing orders freely. Agricultural implement manufacturers are planning on a 50 per cent operation, expecting that their business this year will be 50 to 60 per cent normal. Owing to the very light operation and the carrying over of stocks, the demand from this source last year was very light. Builders of steam shovels and locomotive cranes are increasing operations in order to accumulate stocks, expecting increased demand in the spring. Considerable business is being placed by bolt, nut and rivet and implement manufacturers, and by consumers allied with the automotive industry. Orders include 3000 tons of steel bars and 1000 tons of forging bars from automobile parts manufacturers. Although 2c. is still being quoted on steel bars, plates and structural material, the sources from which steel can be purchased at these prices have become fewer. A leading independent producer has advanced its minimum price to 2.10c. on the three items and some quotations up to 2.25c. are appearing. Considerable business is being placed at prices higher than 2c. Light plates are moving freely at 2.25c. Hoops 1 in. in width and under are now quoted 3.25c. Hard steel angles have advanced $2 a ton to 2.10c. Mills are getting a good volume of orders for plain structural material for stock. In the building field an inquiry is about to be sent out for a municipal power house in Detroit requiring 8000 tons of structural steel. The Standard Oil Co. has placed 26 tanks for Toledo with Reeves Brothers, Alliance, Ohio. These will require 1100 tons of plates. A Toledo shipyard has placed 1250 tons of plates for repair work. A new inquiry has come out for 15 oil stills requiring 500 tons of plates. A local sales agency has booked 2000 car axles.

Jobbers quote steel bars, 2.91c.; plates and structural shapes, 3.01c.; No. 9 galvanized wire, 3.30c.; No. 9 annealed wire, 2.80c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.50c. to 3.76c.; hoops and bands, 3.71c.; cold-rolled rounds, 3.75c.; flats, square and hexagons, 4.25c.

Sheets.—The sheet market is firmer. Black sheets, which have been somewhat irregular owing to the fact that some mills were in need of orders, now appear firm at 3.35c. Light plate mills quote No. 10 sheets at 2.70c., as compared with the more common quotation of 2.75c. for blue annealed sheets.

Reinforcing Bars.—Prices on rail steel reinforcing bars have stiffened. While desirable orders can be placed at 1.95c., the general quotation is now 2c. Prospective work indicates a heavy demand for reinforcing bars in the early spring. Inquiries have come out for 300 tons for a factory building for the General Fire Extinguisher Co., Warren, Ohio, and 170 tons for a factory building for the Ohio Injector Co., Wadsworth, Ohio.

Warehouse Business.—Warehouse orders for sheets have become fairly heavy and prices are now firm at the regular quotations.

Coke.—Some foundries are not getting shipments as fast as desired and are inquiring for small lots of foundry coke. The supply is very limited, evidently being due more to lack of cars than to a shortage. Prices are unchanged. Connellsville foundry coke is quoted at $9.50 to $10 for standard makes. Wise County foundry coke is available at from $8.50 to $9.

Old Material.—The heavy buying of scrap by a Cleveland steel maker noted last week caused a further boost in prices and some speculative buying by dealers. Late in the week, some dealers were asking $22.50 to $23 for heavy melting steel. The price advances brought out a great deal of scrap and prices have reacted slightly, although on most grades they are higher than a week ago. Local mills purchased considerable scrap during the week. One sale of 2000 tons of heavy melting steel was made at $21.50 delivered and sales of turnings are reported at $17. In the Valley district, orders for compressed steel were placed at $21 and $21.25. Local blast furnaces have started to use busheling scrap which has resulted in considerable activity in this grade and a sharp price advance. Sales of No. 1 busheling are reported in round lots at $18.50, some of the material coming from the Detroit territory, but the

price seems to have eased somewhat, as a local dealer later bought 300 tons at $18 delivered.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$20.50 to $20.75
Rails for rolling	22.00 to 23.00
Steel rails under 3 ft.	21.25 to 22.00
Iron rails	18.00 to 18.50
Iron car axles	25.00 to 26.00
Low phosphorus melting	21.50 to 22.00
Cast borings	18.00 to 18.50
Machine shop turnings	16.00 to 16.25
Mixed borings and short turnings	17.00 to 17.50
Compressed steel	18.50 to 19.00
Railroad wrought	19.00 to 19.50
Railroad malleable	22.00 to 23.00
Light bundled sheet stampings	16.50 to 17.00
Steel axle turnings	18.00 to 18.50
No. 1 cast	21.00 to 22.00
No. 1 busheling	17.25 to 17.50
Drop forge flashings over 10 in.	13.75 to 14.00
Drop forge flashings under 10 in.	15.50 to 16.00
Railroad grate bars	18.00 to 18.50
Stove plate	18.00 to 18.50
Pipes and flues	15.50 to 16.00

St. Louis

Pig Iron More Active with Prices Well Maintained

ST. LOUIS, Jan. 16.—The market for pig iron is becoming more active, with Northern iron strong at $29 to $30, Chicago, the Granite City maker quoting $30.50 to $31.50, f.o.b. furnace, $1 higher than the week previous. The latter has been sold up for first quarter, but sold during the week 10,000 tons of basic to an East Side melter. This was the principal sale of the week, and was for first or second quarter delivery. The same concern also sold 3000 tons of foundry iron to a local melter and 1000 to 1200 tons in small lots. The Mount Vernon Car Co., reported last week as being in the market for 1000 tons of wheel iron, purchased this amount as well as 1000 tons of foundry iron, the name of the seller not being given. Southern iron is strong at $23 to $25, Birmingham, but very few sales were made. One maker is quoting the higher price for spot delivery, while another large independent is quoting $23 for immediate shipment and $25 for second quarter. Consumers in the St. Louis industrial district are taking a keener interest in their requirements, although no inquiries of note are pending. A Chicago melter has asked for prices on 500 tons of foundry iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $3.28 from Birmingham (rail and water), $5.17 from Birmingham, all rail, and 81 cents average switching charge from Granite City:

Northern foundry, sil. 1.75 to 2.25	$31.16 to $32.16
Northern malleable, sil. 1.75 to 2.25	31.16 to 32.16
Basic	31.16 to 32.16
Southern foundry, 1.75 to 2.25	$28.17 to 30.17

Finished Iron and Steel.—Jobbers are beginning to show some interest in buying, much sooner than some manufacturers had expected. No particularly large orders have been placed, none for more than 50 tons of principally shapes and plates. Inquiries are also being received for additional supplies. Railroad inquiries are small, lists being only of sufficient size to interest warehouses.

For stock out of warehouse we quote: Soft steel bars, 2.90c. per lb.; iron bars, 2.90c.; structural shapes, 3c.; tank plates, 3c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, cold rolled, one pass, 4.85c.; cold drawn rounds, shafting and screw stock, 3.90c.; structural rivets, 3.85c. per 100 lb.; boiler rivets, 3.95c.; tank rivets, $\frac{7}{8}$ in. and smaller, 55 per cent off list; machine bolts, large, 50 per cent; smaller, 50 per cent; carriage bolts, large, 45 per cent; small, 45 per cent; lag screws, 55 per cent; hot pressed nuts, square or hexagon blank, $2.75; and tapped, $2.75 off list.

Coke.—The coke market is still very active. Domestic coke is in exceptionally good demand, and there is a heavy call for foundry grades with the steady increase of melt in the district. The Granite City by-product maker is well sold up. The Connellsville market is strong at $8.50 to $9, with some grades selling at $10.

Old Material.—The market for old material is stronger and continues to score advances all down the line. New buying is appearing and dealers look for the market to stiffen considerably over the prices quoted today as soon as buyers show their hand, which it is believed they must do within the next two weeks, as stocks are low and orders must be filled. Railroad offerings are small and dealers are eager to buy everything in sight.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$20.00 to $20.50
Rails for rolling	21.00 to 21.50
Steel rails, less than 3 ft.	22.00 to 22.50
Relaying rails, standard section	26.00 to 29.00
Cast iron car wheels	26.00 to 26.50
Heavy melting steel	17.00 to 17.50
Heavy shoveling steel	16.50 to 17.00
Frogs, switches and guards cut apart	20.00 to 20.50
Per Net Ton	
Heavy axles and tire turnings	12.50 to 13.00
Steel angle bars	18.50 to 19.00
Iron car axles	26.50 to 27.00
Steel car axles	21.00 to 21.50
Wrought iron bars and transoms	22.00 to 22.50
No. 1 railroad wrought	17.50 to 18.00
No. 2 railroad wrought	17.00 to 17.50
Railroad springs	21.25 to 21.75
Steel couplers and knuckles	21.25 to 21.75
Cast iron borings	11.00 to 11.50
No. 1 busheling	14.00 to 14.50
No. 1 railroad cast	20.00 to 20.50
No. 1 machinery cast	21.00 to 21.50
Railroad malleable	20.50 to 21.00
Machine shop turnings	9.50 to 10.00

Philadelphia

Plates, Shapes and Bars Advanced $2 to $3 a Ton by Nearly All Mills

PHILADELPHIA, Jan. 16.—A strong market in plates, shapes and bars has developed within a few days, with advances of $2 to $3 a ton by nearly all mills, and on small lots the advance in some instances is as much as $5 a ton. The Midvale Steel & Ordnance Co. was the first large independent to announce 2.10c., Pittsburgh, as its minimum on these three commodities, and other mills have taken similar action. The Bethlehem Steel Co. began quoting the new prices today. The Carnegie Steel Co. has quoted 2.10c., Pittsburgh, on small lots to local consumers within the past day or two.

The advance in prices was preceded by fairly large buying, particularly in plates. Such business was closed at about 2c., Pittsburgh, and there are still some outstanding quotations of 2c., but on all new business all indications are that 2.10c. is the bottom today. On plates and bars a Buffalo mill is quoting 2.15c. and 2.25c. respectively. While looking for no "runaway" market, steel company sales executives express the opinion that 2.25c., Pittsburgh, will be the established price for plates, shapes and bars within 30 to 60 days.

Next to the advance in heavy finished products, the most remarkable market feature is the rapidly climbing prices of old material. Advances ranging from $1 to $2 a ton have been recorded on many grades.

Railroad embargoes and shortage of cars are causing more operating and shipping difficulties than at any time so far this winter. Due to heavy snows, New England is embargoed for all shipments in or out except anthracite and foods. The Bethlehem Steel Co. is having great trouble in getting a sufficient number of cars to move coal from its mines to its coke ovens. The New England embargo is creating a temporary shortage of scrap, which is largely responsible for the steadily advancing market.

Pig Iron.—The past week has brought no noteworthy change in the pig iron situation. There has been fair buying of foundry iron, mostly in lots ranging from a carload up to 200 or 300 tons, and some new inquiries have appeared, those of size including 2500 tons for a Trenton, N. J., radiator company for second quarter and 2000 tons for first half for a steam pump company, whose buying office is in New York. Eastern furnaces continue to quote $28, furnace, for No. 2 plain, $29 for No. 2X and $30 for No. 1X, and in one or two instances furnaces have quoted $1 a ton above these prices. Notwithstanding the strength of the eastern Pennsylvania situation, Virginia pig iron is weak and furnaces there are having difficulty in disposing of their product on the basis of $27, furnace, for No. 2 plain and

this price has been shaded. On large tonnages, such as 4500 tons recently placed by a Virginia cast iron pipe company, they are unable to compete with Alabama iron and their high freight rate makes it difficult to compete for shipment to this district. The same cast iron pipe maker is in the market for 3000 tons additional. Receipts of foreign iron in the week ended Jan. 13 were 4715 tons, of which 3500 tons came from England, 500 tons from Scotland and 715 tons from France.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76 cents to $1.64 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$28.76 to $29.14
East. Pa. No. 2X, 2.25 to 2.75 sil.	29.76 to 30.14
East. Pa. No. 1X	30.76 to 31.14
Virginia No. 2 plain, 1.75 to 2.25 sil.	32.17 to 33.17
Virginia No. 2X, 2.25 to 2.75 sil.	33.17 to 34.17
Basic delivered eastern Pa.	28.00 to 28.50
Gray forge	27.75 to 28.00
Malleable	31.14 to 31.26
Standard low phos. (f.o.b. furnace)	35.00
Copper bearing low phos. (f.o.b. furnace)	30.00

Foreign Pig Iron

All prices f.o.b. cars Philadelphia, duty paid.

Scotch foundry 2.50 to 3 sil.	$28.75 to $29.25
English foundry, 1.50 to 2 sil.	28.00 to 28.50
English foundry, 2 to 2.50 sil.	28.50 to 29.00
English foundry, 2.50 to 3 sil.	29.00 to 29.50
Continental foundry, 1.80 to 2.50 sil.	27.50 to 28.00
Continental foundry, 2.50 to 3 sil.	27.75 to 28.75
Low phos., copper free, guar. not over 0.035 per cent phos.	28.50 to 29.50

Ore.—Receipts of iron ore from Sweden at this port last week were 6303 tons.

Coke.—Some of the Eastern blast furnaces are having difficulty in getting coke on account of shortage of cars. Prices now quoted on blast furnace coke are $8.50, Connellsville, for contracts and $8.75 for spot shipments. Foundry coke is being sold at prices ranging from $9.50 to $10, Connellsville.

Ferroalloys.—British producers of ferromanganese have put into effect a further advance of $5 a ton, making the price at Atlantic ports, duty paid, $107.50 per gross ton. Domestic producers have put up their prices to $107.50, f.o.b. furnace. Several thousand tons were sold at $102.50 just before the advance went into effect.

Semi-Finished Steel.—An Eastern subsidiary of the Steel Corporation is in the market for 5000 to 10,000 tons of open-hearth rerolling billets, and this business probably will be closed within a day or two at $38, Pittsburgh. This is a price, however, which probably could not be duplicated even on an exceptional tonnage. A sale of 1250 tons was made last week at $38.50, Pittsburgh. Most of the mills are now quoting $40, Pittsburgh, for rerolling billets and $45 for forging billets. A Maryland tin plate company bought 2500 tons of sheet bars for first quarter about a week ago at $37.50, Pittsburgh, and is inquiring for 2500 tons additional for second quarter, on which quotations will probably be higher.

Plates.—Following a week of exceptional buying, during which one or two Eastern companies had the best business in any week since 1920, the price was advanced by all mills to 2.10c., Pittsburgh. Most of the business negotiated just prior to the advance was at 2c., Pittsburgh, and some at 1.95c. Buyers would probably find it next to impossible today to break the 2.10c. price. The Baldwin Locomotive Works bought 4000 to 5000 tons for 100 locomotives it will build for the Pennsylvania Railroad; the Pennsylvania bought 2000 to 3000 tons for locomotives it will build in its own shops at Altoona, and the Philadelphia & Reading closed for 3000 tons of car plates. There was also a great deal of miscellaneous buying in smaller lots.

Structural Shapes.—The market on structural shapes appears to be firm at 2.10c., Pittsburgh, all companies having announced the new price to customers within the past few days. There are some outstanding "protections" at 2c., but these are for short periods. The Phoenix Bridge Co. has taken the largest job recently awarded in this city, the power plant for the Philadelphia Electric Co., which will require 2800 tons.

Bars.—Quotations on steel bars have been advanced by nearly all mills to 2.10c., Pittsburgh, with 2.15c. to 2.25c. being quoted in some instances on small lots. A good deal of business was booked in the past week and there are few mills now able to give better than 60 days delivery. Bar iron is being quoted from 2c. to 2.15c., Pittsburgh. A general advance to a minimum of 2.10c. is predicted by those makers now quoting 2c., and the advance will probably take effect this week.

Sheets.—So many sheet mills are sold up for first quarter that it is becoming easier for companies which recently advanced their prices to get the higher quotations. Blue annealed sheets are being more frequently sold at 2.75c., although 2.60c. has not entirely disappeared, while black sheets have been sold at 3.50c. and galvanized at 4.50c., Pittsburgh, when fairly good deliveries could be given.

Track Supplies.—The Pennsylvania Railroad has inquired for 700,000 heat-treated track bolts and 500,000 lb. of track spikes. An advance in tie plates has been put into effect.

Warehouse Business.—Prices for steel out of jobbers' stocks are unchanged, and for local delivery are as follows:

Soft steel bars and small shapes, 3c.; iron bars (except bands), 3c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ x ½ in., 3.20c.; round edge steel planished, 4c.; tank steel plates, ¼-in. and heavier, 3.10c.; tank steel plates, ⅜-in., 3.30c.; blue annealed steel sheets, No. 10 gage, 3.85c.; black sheets, No. 28 gage, 4.60c.; galvanized sheets, No. 28 gage, 5.75c.; square twisted and deformed steel bars, 3.15c.; structural shapes, 3.10c.; diamond pattern plates, ¼-in., 4.80c.; ⅜-in., 5c.; spring steel, 4.25c.; round cold-rolled steel, 3.85c.; square and hexagons, cold-rolled steel, 4.35c.; steel hoops, No. 13 gage and lighter, 4.25c.; steel bands, No. 12 gage to ⅞-in., inclusive, 3.825c.; rails, 3c.; tool steel, 8.50c.; Norway iron, 6.50c.

Old Material.—Railroads have declared an embargo on all shipments in or out of New England except anthracite coal and foods, and this has shut off completely all scrap. As New England is the principal source of scrap for Eastern steel plants, there has been a great scurrying for supplies, with advances in prices of $1 to $2 a ton on practically every item in the list quoted below. There have been no conspicuously large sales, but nearly all mills are in the market for all the material they can get shipped. Steel scrap is now quoted at $20 to $21; cast iron car wheels at $23 to $24; No. 1 railroad wrought, $23 to $23.50; turnings for steel works and rolling mills, $17 to $17.50.

We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$20.00 to $21.00
Scrap rails	20.00 to 21.00
Steel rails for rolling	22.00 to 23.00
No. 1 low phos. heavy 0.04 and under	24.00 to 25.00
Cast iron car wheels	23.00 to 24.00
No. 1 railroad wrought	23.00 to 23.50
No. 1 yard wrought	19.00 to 20.00
No. 1 forge fire	17.50 to 18.00
Bundled sheets (for steel works)	17.00 to 17.50
No. 1 busheling	19.00 to 20.00
Turnings (short shoveling grade for blast furnace use)	16.50 to 17.00
Mixed borings and turnings (for blast furnace use)	16.50 to 17.00
Machine shop turnings (for steel works use)	17.00 to 17.50
Machine shop turnings (for rolling mill use)	17.00 to 17.50
Heavy axle turnings (or equivalent)	19.00 to 20.00
Cast borings (for steel works and rolling mills)	16.50 to 17.00
Cast borings (for chemical plants)	22.50 to 23.00
No. 1 cast	23.00 to 24.00
Heavy breakable cast (for steel plants)	21.00 to 22.00
Railroad grate bars	18.00 to 18.50
Stove plate (for steel plant use)	18.00 to 18.50
Railroad malleable	18.00 to 19.00
Wrought iron and soft steel pipes and tubes (new specifications)	17.00 to 17.50
Shafting	23.00 to 24.00
Steel axles	23.00 to 24.00

Plans for extensions to its Youngstown property are being developed by the Kalman Steel Co., Chicago. The Youngstown plant manufactures steel reinforcing bars and is operating close to capacity, reflecting heavy overhanging demand for building materials.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Plates

Sheared, tank quality, base, per lb.....2.10c.

Structural Material

Beams, channels, etc.....2.10c.

Iron and Steel Bars

Soft steel bars, base, per lb.....2.00c. to 2.10c.
Refined iron bars, base, per lb.....2.60c.

Hot-Rolled Flats

Hoops, base, per lb.....2.75c. to 2.90c.
Bands, base, per lb.....2.75c. to 2.90c.
Strips, base, per lb.....275c. to 2.90c.

Cold-Finished Steels

Bars and shafting, base, per lb.....2.50c.
Strips, base, per lb.....4.50c.

Wire Products

Nails, base, per keg.....$2.70 to $2.80
Galvanized nails, 1 in. and over..... 1.50 over base
Galvanized nails, less than 1 in..... 2.00 over base
Bright plain wire, base, per 100 lb..... 2.45 to 2.60
Annealed fence wire, base, per 100 lb..... 2.45 to 2.70
Spring wire, base, per 100 lb..... 3.35 to 3.50
Galvanized wire, base, per 100 lb..... 2.95 to 3.05
Galvanized barbed, base, per 100 lb..... 3.35 to 3.45
Galvanized staples, base, per keg..... 3.35 to 3.45
Painted barbed wire, base, per 100 lb..... 3.00 to 3.10
Polished staples, base, per keg..... 3.00 to 3.10
Cement coated nails, base, per count keg..... 2.20 to 2.30
Woven fence, carloads (to jobbers).....70½ per cent off list
Woven fence, carloads (to retailers).....68 per cent off list

Bolts and Nuts

Machine bolts, small, rolled threads..60 and 5 per cent off list
Machine bolts, small, cut threads...50 and 10 per cent off list
Machine bolts, larger and longer....50 and 10 per cent off list
Carriage bolts, ⅜ x 6 in.:
Smaller and shorter, rolled threads, 50, 10 and 5 per cent off list
Cut threads .....50 per cent off list
Longer and larger sizes.....50 per cent off list
Lag bolts .....60 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads...50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in.:
Smaller and shorter.....45 per cent off list
Larger and longer sizes.....45 per cent off list
Hot pressed square or hex. blank nuts...$3.25 to $3.50 off list
Hot pressed nuts, tapped..... 3.25 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, blank..... 325 to 3.50 off list
C.p.c. and t. sq. or hex. nuts, tapped..... 3.25 to 3.50 off list
Semi-finished hex. nuts:
9/16 in. and smaller, U. S. S...75, 10 and 5 per cent off list
⅝ in. and larger, U. S. S....70, 10 and 2½ per cent off list
Small sizes, S. A. E.....80 and 5 per cent off list
S. A. E., ⅝ in. and larger.....75 and 5 per cent off list
Stove bolts in packages.....80 and 5 per cent off list
Stove bolts in bulk.....80, 5 and 2½ per cent off list
Tire bolts .....50, 10 and 10 per cent off list

Cap and Set Screws

Milled square and hex. head cap screws....75 per cent off list
Milled set screws.....75 per cent off list
Upset cap screws.....75 and 10 per cent off list
Upset set screws.....80 per cent off list

Rivets

Large structural and ship rivets base, per 100 lb.....$3.00
Large boiler rivets, base, per 100 lb..... 3.10
Small rivets .....65 and 10 to 65 and 5 per cent off list

Track Equipment

Spikes, 9/16 in. and larger, base, per 100 lb..... $2.75
Spikes, ½ in. and smaller, base, per 100 lb..... 3.50
Spikes boat and barge, base, per 100 lb..... 3.50
Track bolts, base, per 100 lb.....$3.75 to 4.25
Tie plates, per 100 lb..... 2.35 to 2.50
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	49	23½	¼ to ⅜.....	+ 7	+33
¼ to ⅜.....	55	29½	½	26	8
½	60	46½	¾	32	17
⅝	64	52½	1 to 1½.....	34	19
1 to 2.....	66	54½			

Lap Weld

2	59	47½	2	29	15
2½ to 6.....	63	51½	2½ to 6.....	32½	19
7 to 8.....	60	47½	7 to 12.....	30	17
9 to 12.....	59	46½			

Butt Weld, extra strong, plain ends

⅛	45	28½	¼ to ⅜.....+15		+48
¼ to ⅜.....	51	34½	½	25	13
½	57	46½	¾	32	18
¾	62	51½	1 to 1½.....	34	20
1 to 1½.....	64	53½			
2 to 3.....	65	54½			

Lap Weld, extra strong, plain ends

2	57	46½	2	30	17
2½ to 4.....	61	50½	2½ to 4.....	33	21
4½ to 6.....	60	49½	4½ to 6.....	32	20
7 to 8.....	56	43½	7 to 8.....	25	13
9 to 12.....	50	37½	9 to 12.....	20	8

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in. .....+12	
2 to 2¼ in.....	36	1¾ to 1⅞ in.....+ 2	
2½ to 3 in.....	47	2 to 2¼ in.....— 8	
3¼ to 13 in.....	52	2½ to 3 in.....—13	
		3¼ to 4½ in.....—15	

To large buyers of steel tubes a supplementary discount of 5 per cent is allowed.

Standard Commercial Seamless Boiler Tubes

Discounts on cold-drawn tubes in carload lots, f.o.b. Pittsburgh, follow:

1 in.	55	2½ and 2¾ in.....	38
1¼ and 1½ in.....	47	3 in.	42
1¾ in.	31	3¼ to 4 in.....	47
2 and 2¼ in.....	34	4¼ in. and 5 in.....	39

Hot Rolled

3 in.	44	3¼ to 4 in.....	49

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extras for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be sold at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Carbon under 0.30, base.....85 per cent off list
Carbon 0.30 to 0.40, base.....83 per cent off list
Plus usual differentials and extras for cutting.

Seamless Locomotive and Superheater Tubes

Cents per Ft.		Cents per Ft.	
2-in. O.D. 12 gage.....	14	2¼-in. O.D. 10 gage....	19
2-in. O.D. 11 gage.....	15	3-in. O.D. 7 gage.....	34
2-in. O.D. 10 gage.....	16	1½-in. O.D. 9 gage.....	13¾
2¼-in. O.D. 12 gage....	16	5⅝-in. O.D. 9 gage.....	53
2¼-in. O.D. 11 gage....	17	5½-in. O.D. 9 gage.....	55

Tin Plate

Standard cokes, per base box.....$4.75

Terne Plate

(Per package, 200-lb.)

8-lb. coating	$9.30	25-lb. coating I. C....	$14.25
8-lb. coating I. C.....	9.60	30-lb. coating I. C....	15.25
15-lb. coating I. C.....	11.80	35-lb. coating I. C....	16.25
20-lb. coating I. C.....	13.00	40-lb. coating I. C....	17.25

Sheets

Blue Annealed

Nos. 9 and 10 (base), per lb.....2.50c.

Box Annealed, One Pass Cold Rolled

No. 28 (base), per lb.....3.35c.
Regular auto body sheets, base (22 gage), per lb., 4.70c. to 5.00c.

Galvanized

No. 28 (base), per lb.....4.35c.

Tin-Mill Black Plate

No. 28 (base), per lb.....3.35c.

Manufacturers have pamphlets, which can be had upon application, giving price differentials for gage and extras for length, width, shearing, etc.

Freight Rates

All rail freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic.	$0.325	Buffalo	$0.265	St. Louis	$0.43
Philadelphia, export..	0.235	Cleveland	0.215	Kansas City	0.735
Baltimore, domestic...	0.315	Cleveland, Youngstown Comb.	0.19	Kansas City (pipe)...	0.705
Baltimore, export.....	0.225	Detroit	0.29	St. Paul	0.60
New York, domestic..	0.34	Cincinnati	0.29	Omaha	0.735
New York, export....	0.255	Indianapolis	0.31	Omaha (pipe)	0.705
Boston, domestic.....	0.365	Chicago	0.34	Denver	1.27
Boston, export.....	0.255			Denver (pipe)	1.215

Pacific Coast	$1.50	Jacksonville, all rail..	0.50
Pac. Coast, ship plates	1.20	Jacksonville, rail and water	0.415
Birmingham	0.69	New Orleans	0.515
Memphis	0.385		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 30c. to 40c.; ship plates, 30c. to 40c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 30c. to 40c.; sheets and tin plates, 50c.; rods, wire rope cable and strands, 75c.; wire fencing, netting and stretcher, 50c.; pipe not over 8 in. in diameter, 50c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

FABRICATED STEEL BUSINESS

December Bookings Show Upswing and 1922 Established a Record for Tonnage

WASHINGTON, Jan. 16.—Continuation of building boom this spring is forecast by the upward swing in sales of fabricated structural steel in December, reported by the Department of Commerce through the Bureau of the Census. An increase of about 20 per cent over November marked the turning point from a series of seasonal declines in fabricated steel orders and occurred a month earlier than last winter, when December was the month of minimum orders. December sales amounted to 58.3 per cent of shop capacity, as against 48.4 per cent in November.

Estimated total sales of fabricated structural steel in 1922 amounted to 1,929,400 tons or 64.3 per cent of shop capacity, as against 997,200 tons in 1921, or 35.1 per cent of shop capacity.

Sales reported by 141 firms, with a total revised capacity rating of 215,210 tons per month, amounted to 125,479 tons in December, as against 104,727 tons in November and 124,948 tons in October. The following table shows final revised figures from April to November, 1922, based on reports of 158 identical firms having a capacity of 220,790 tons per month, together with the preliminary report for December, based on 141 firms. The current month's figures are compared to the previous final figures by prorating to the estimated total capacity of structural fabricating shops, namely, 250,000 tons per month.

	Actual Tonnage Booked	Per Cent of Capacity	Estimated Total Bookings
April	198,529	89.9	224,300
May	180,558	81.8	204,500
June	162,139	73.4	183,500
July	152,023	68.9	172,300
August	150,700	68.3	170,800
September	141,418	64.1	160,300
October	126,535	57.3	143,300
November	106,315	48.4	121,000
December	125,479*	58.3	145,800

*From 141 firms who reported in time for this report.

The following table shows yearly figures of structural steel sales, based on new estimated capacities as the results of special survey of industry recently conducted by the Bureau of the Census, and the percentage of sales to shop capacity as shipped by the Bridge Builders and Structural Society up to April, 1922, and reports to the Bureau of Census since then:

	Estimated Monthly Tonnage Capacity	Per Cent of Sales to Capacity	Estimated Tonnage Sales
1913	190,000	50.3	1,146,300
1914	191,000	50.4	1,155,200
1915	194,000	70.0	1,629,600
1916	200,000	69.4	1,665,600
1917	207,000	60.2	1,495,400
1918	218,000	55.6	1,454,500
1919	224,000	53.4	1,435,400
1920	232,000	53.8	1,496,500
1921	237,000	35.1	997,200
1922	250,000	64.3	1,929,400

Surprising Tonnage Up for Figures, Much of It for Oil Tanks

Following are awards of fabricated steel work:

Sinclair Consolidated Oil Corporation, New York, 15 80,000-bbl. oil tanks for Oklahoma field, 4500 tons, to Chicago Bridge & Iron Works; 10 of same capacity, 3000 tons, to Petroleum Iron Works.

United Gas Improvement Co., power house at Devon, Conn., 250 tons, to Porcupine Co.

Apartment building at Fifth Avenue and Tenth Street, New York, 1400 tons, to Taylor-Fichter Steel Construction Co.

Natatorium at United States Naval Academy, Annapolis, Md., 500 tons, to American Bridge Co.

Homeopathic Hospital, Providence, R. I., 600 tons, to Lehigh Structural Steel Co.

Western Union Telegraph Co., Chattanooga, Tenn., 300 tons, to a local fabricator.

Philadelphia Electric Co., power plant, Philadelphia, 2800 tons, to Phoenix Bridge Co.

Continental Life Insurance Co., building, Chicago, 746 tons, to Morava Construction Co.

Illinois Central, reinforcement of short route viaduct, Louisville, Ky., 679 tons, to Virginia Bridge & Iron Co.

Meyer-Keiser Bank Building, Indianapolis, 560 tons, to Insley Mfg. Co.

Bridge work, Lafayette and Harrison Counties, Missouri, 215 tons, to American Bridge Co.

Chicago & Northwestern, 71-ft. through plate girder span, Eighth Avenue viaduct, Madison division, 190 tons, to Milwaukee Bridge Co.

Grand stand, Russell race track, Louisville, Ky., 600 tons, to Pan-American Bridge Co.

Bell Telephone building, Philadelphia, 400 tons, to McClintic-Marshall Co.

Bridge at Glasgow, Mo., 1600 tons, to Mt. Vernon Bridge Co.

Otis Steel Co., Cleveland, floor for soaking pits, 200 tons, to Variety Iron & Steel Works.

Hudson Store addition, Detroit, 700 tons, to Russell Wheel & Foundry Co.

Missouri State Life Insurance Co., addition office building, St. Louis, 430 tons, to Mississippi Valley Structural Steel Co.

Gas holder at Casper, Wyo., 500 tons of plates, to Stacey Mfg. Co.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Equitable Building, Seventh Avenue and Thirty-second Street, New York, 18,000 to 20,000 tons.

Roosevelt Hotel, Madison Avenue and Forty-sixth Street, New York, 8000 tons. (Bids have previously been received and rejected on this work.)

George Washington High School, New York, 3000 tons.

Business administration building and women's dormitory at Columbia University, New York, 500 tons.

Manhattan storage warehouse, West Fifty-second Street, New York, 1100 tons.

Sinclair Consolidated Oil Corporation, New York, 30 80,000-bbl. oil tanks for Wyoming field, 8700 tons.

Public Service Corporation of New Jersey, viaduct over tracks of Central Railroad of New Jersey, 300 tons.

Peter-Boro Hotel, Detroit, 800 tons.

New York Telephone Co., Buffalo, new building, 750 tons.

Standard Oil Co. of Indiana, 15,000 to 30,000 tons, oil storage tanks, Casper, Wyo.

Pan-American Petroleum & Transit Co., storage tanks in Louisiana, 7500 tons.

Chicago, Burlington & Quincy, outbound freight house, Harrison Street terminal, Chicago, 3500 tons, bids to go in next week.

Chicago Union Station Co., Roosevelt Road viaduct, 4000 tons, new bids to be received Jan. 23.

High school, Omaha, Neb., 1000 tons.

Carpenter Building, Milwaukee, 1500 tons, new bids asked.

Union League Club building, Chicago, 4800 tons, bids returned and project indefinitely postponed.

GERMAN STEEL PRICES SOAR

React to Falling Mark—Advance Averages 22 Per Cent—Foundry Iron Also Up

(By Cable)

BERLIN, GERMANY, Jan. 15.—Foundry iron No. 1 has been advanced to 194,900 m. per metric ton ($14.45 per gross ton, at 0.73c. per 100 m.), compared with 179,400 m. ($18.04) last week and 153,688 m. ($23.42) on Dec. 26, the date of the last advance in steel prices.

Steel ingots have been advanced, by the Steel Syndicate, to 240,800 m. ($17.85), compared with 197,300 m. ($19.84) on Dec. 26, when exchange was quoted at 1½c. per 100 m. Steel bars have been raised to 328,000 m. (1.09c. per lb.), compared with 270,000 m. (1.21c. per lb.) and thin steel sheets to 497,000 m. (1.65c. per lb.), compared with 414,700 m. (1.86c. per lb.).

[Since Nov. 6 these prices have been increased about 150 per cent, as expressed in marks; but less than 10 per cent on the gold basis, for the mark has fallen just about enough to equalize the real prices with those prevailing ten weeks ago. On Nov. 6 foundry iron No. 1 was quoted at 83,994 m. ($14.40, at 1 11/16c. per 100 m.); steel ingots at 96,700 m. ($16.58); steel bars at 132,000 m. (1.01c. per lb.); thin steel sheets at 196,000 m. (1.50c. per lb.).]

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Jan.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
10	14 75	14.50	38.62½	7.75	7.40	7.35	7.00
11	14.75	14.50	39.20	7.85	7.60	7.30	6.95
12	14.75	14.50	39.25	7.95	7.65	7.25	6.90
13	14.75	14.50	....	7.95	7.65	7.25	6.90
15	14.87½	14.50	39.00	7.95	7.75	7.25	6.90
16	14.87½	14.50	38.75	7.95	7.75	7.22½	6.87½

*Refinery quotation; delivered price is 14.75c.

New York

NEW YORK, Jan. 16.

Demand is not large, but a moderate business is being done in all the markets except zinc. Copper is the only market in which there has been no change in price. Tin and lead have advanced and zinc has declined.

Copper.—A moderate business is being done each day, and while here and there small lots can be obtained at 14.62½c., delivered, the minimum price for any large business is still 14.75c., delivered. Most producers have sold their output for January-February delivery and are not pressing the market. Quotations for foreign consumption have eased slightly, but thus far have not affected the domestic market. Despite the situation in Germany that country continues to buy the red metal, although not on so large a scale as before. Lake copper is quoted at 14.75c. to 15c., delivered. Official announcement is made of the acquisition of the Chile Copper Co. by the Anaconda Copper Mining Co.

Tin.—The week has been an active one in Straits tin after several weeks of extreme dullness. Although the market a week ago today appeared stagnant, with sellers offering the metal at 38.25c., late in the day it devlops that 200 tons was sold involving March-April-May-June delivery at a range of 38.25c. to 38.75c. Consumers were the buyers. This is the most distant delivery business recorded in some time. The two following days, Jan. 10 and 11, were exceedingly active, about 800 tons having been sold on the former and 500 tons on the latter day. The business on both days was done during a brief period about the middle of the day, dealers and consumers being the buyers. On Friday, Jan. 12, about 150 tons more was sold and the same quantity is reported sold yesterday. In the week covered by this report therefore, close to 2000 tons changed hands, an unusually active week. Spot Straits tin was quoted today at 38.75c., New York, and in London values were about £1½ per ton higher than a week ago at £180 15s. for spot standard, £182 10s. for future standard, and £182 7s. 6d. for spot Straits. Arrivals thus far this month have been 4385 tons, with 5543 tons reported afloat.

Lead.—Due to a fair demand and pronounced lack of sellers, the market is exceedingly strong and has advanced almost daily. The second advance for the week of the leading interest was made the day following the first advance and its quotations now stand 7.50c., New York, or 7.30c., St. Louis. In the outside market values have steadily increased until today quotations are 7.75c., St. Louis, or 7.95c., New York, with prompt January and February lead very scarce. Production is not equal to consumption and a run-away market may be the result.

Zinc.—The market for prime Western zinc is exceedingly quiet and inclined to be weaker, particularly for future delivery. Prompt metal is not too plentiful. Today inquiries, both from abroad and from domestic consumers, are reported. In this market, as in all others, the chaotic condition on the railroads is interfering with deliveries. Quotations are somewhat mixed, particularly for future delivery, but a fair appraisal places prime Western for early delivery at 6.85c. to 6.90c., St. Louis, or 7.20c. to 7.25c., New York, with future delivery about five points per month under these levels.

Antimony.—The market continues to gain strength and wholesale lots of Chinese metal for early delivery are quoted at 6.75c. per lb., New York, duty paid.

Aluminum.—Quotations are available only from importers of the foreign made product. Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted at 22.50c. to 23.50c. per lb., New York, duty paid.

Old Material.—Business has been of a routine nature, but values continue firm. Dealers' selling prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	14.25
Copper heavy and wire	13.25
Copper, light and bottoms	11.75
Heavy machine composition	11.00
Brass, heavy	9.00
Brass, light	7.25
No. 1 red brass or composition turnings	10.50
No. 1 yellow rod brass turnings	8.25
Lead, heavy	6.25
Lead, tea	5.00
Zinc	5.00

Chicago

JAN. 16.—Tin and lead have advanced, but other metals are unchanged. Demand for lead is not particularly active, but the leading producer has advanced prices and available supplies are not plentiful. Buying of tin is variable, ranging from stagnancy on one day to great activity on the next. On the whole, however, a considerable tonnage is changing hands and it is beginning to appear as if the London operators who have been working for higher prices for several months have achieved their end. In fact, further advances are looked for by some observers. Zinc is exceedingly dull with offerings in excess of demand. Antimony is more active and future prices have advanced a few points although spot quotations are unchanged. Among the old metals, grades of tin and lead have gone up in sympathy with virgin material. We quote, in carload lots, lake copper, 15c.; tin, 40c. to 40.50c; lead, 7.70c.; spelter, 7c.; antimony, 8.50c., in less than carload lots. On old metals we quote copper wire, crucible shapes and copper clips, 12.25c.; copper bottoms, 10.25c.; red brass, 9.25c.; yellow brass, 7.25c.; lead pipe, 6c.; zinc, 4.75c.; pewter, No. 1, 25c.; tin foil, 27c.; block tin, 34c., all buying prices for less than carload lots.

St. Louis

JAN. 16.—The lead market ruled steady throughout the week, closing 25c. higher at 7.50c., car lots, due to the advance made by the leading interest. Slab zinc held steady, about unchanged for the week at 7c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 3c.; pewter, 15c.; tin foil, 20c.; tea lead, 2c.; aluminum, 9c.

Valley Scrap Market

YOUNGSTOWN, Jan. 16.—Due to more active purchasing the past two weeks by Valley melters, prices of scrap metals have advanced an average of $1 per ton. Heavy melting scrap has been marked up from $21 to $22, while some dealers will not consider business under $22.50.

Inadequacy of labor supply is still a deterrent in pipe departments of Valley plants.

Orders have been issued by General Manager J. D. Jones, Algoma Steel Corporation, Sault Ste. Marie, Ont., to prepare for the opening of the rail mill about March 1. The mill was shut down Sept. 1 last.

PERSONAL

James Abercrombie Burden, vice-president and chairman of the executive committee of the Eastern Steel Co., Pottsville, Pa., has been elected president of the company. He had been acting president since the resignation some years ago of Veryl Preston, whom he succeeds. Mr. Burden was born in New York, Jan. 16, 1871, and was graduated from Harvard in the degree A.B. in 1893. His first connection was with the Burden Iron Co., Troy, N. Y., of which he became vice-president in 1900, succeeding his father as president six years later. He is also a director of the O'Rourke Engineering Construction Co., Port Henry Iron Ore Co., Winsdor Trust Co., New York, and the United National Bank, Troy. He is active in various other industrial and social interests and is a director of the American Iron and Steel Institute.

J. A. BURDEN

The Commonwealth Steel Co., St. Louis, has reorganized its purchasing and financial departments following the decease of George K. Hoblitzelle announced in THE IRON AGE of Nov. 9. Frank L. Morey, secretary, will assume the duties of treasurer, and Harrison Hoblitzelle has been made manager of purchase and supplies and assistant treasurer. Cecil R. Pilsbury has been appointed general auditor covering the plant records and head office accounting.

L. J. Gibbons, previously with the Maher Engineering Co., is now associated with the Chicago sales office of the Standard Turbine Corporation, Wellsville, N. Y.

Thomas E. Beasley will be district sales manager in charge of motor and magnet sales of the St. Louis office recently opened by the Ohio Electric & Controller Co., Cleveland.

John F. Tinsley, vice-president and general manager Crompton & Knowles Loom Works, Worcester, Mass., has been elected president of the Worcester Chamber of Commerce.

Capt. Clayton M. Simmers has reported at the Charlestown Navy Yard, Boston. He succeeds Capt. William T. DuBose as industrial manager. Capt. DuBose goes to Washington.

Fred W. Lammers has resigned as vice-president and general manager of the Cincinnati Steel Castings Co., Cincinnati, and on Jan. 1 became connected with the firm of Herbert F. Topp & Co., pig iron, coke and alloys, 1017-18 First National Bank Building. Mr. Lammers has been connected with the foundry industry for the past 20 years.

J. P. Cashman, who has been associated with the Western Drop Forge Co., Marion, Ind., for 15 years, during the last three of which he has been director and treasurer and more recently vice-president and general manager, has resigned those positions. On Feb. 1, he will assume the management of the Fairmont Drop Forge Co., Fairmont, Ind., in which he has acquired a personal interest.

William G. Abbot, formerly in charge of the statistical department of the Consolidated Steel Corporation, has been appointed research director of the National Foreign Trade Council, India House, Hanover Square, New York.

E. W. Harrison, president and director of the Superior Steel Corporation, Pittsburgh, for the past six years, has resigned from that company.

W. W. Sayers has been promoted to chief engineer of the Link Belt Co.'s Philadelphia works and Eastern operations.

Louis Lanyi has been appointed to take charge of a new branch office established in Detroit by the Power Specialty Co., 111 Broadway, New York.

R. F. Hetzel, formerly chief engineer of the Goetze Gasket & Packing Co., New Brunswick, N. J., has become connected with the National Steel Construction Co., Seattle, Wash., as superintendent.

William Goodman has been appointed to succeed J. E. Sague, resigned, as vice-president of the Worthington Pump & Machinery Corporation, Broadway and Cedar Street, New York.

J. W. White has severed his connection with the Maxwell Motor Co., Detroit, to take charge of the development of steel-disc wheels for the Wire Wheel Corporation of America, Buffalo.

Fitch S. Bosworth has been appointed manager of the Chicago office of the Chain Belt Co., Milwaukee. Mr. Bosworth has been in charge of the Chain Belt Co.'s St. Louis office for the last three years and has specialized on chain and conveying engineering problems. With him will be associated Raymond X. Raymond, who for several years has been connected with the export sales department in Milwaukee. Thomas F. Scannell, formerly of the Chicago office, has been placed in charge of the St. Louis office.

J. E. Timmons has been placed in charge of the steam and electrical department of Frank Toomey, Inc., 127-131 North Third Street, Philadelphia, to succeed James A. Condon, who resigned to enter business for himself. Mr. Timmons comes to Frank Toomey, Inc., from the Robbins & Myers Co., Philadelphia, motor manufacturers, previous to which connection he had been 14 years with the Toomey company.

C. F. Blue has resigned as director and president of the Carbon Steel Co., Pittsburgh, and W. W. Noble has resigned as secretary and director of the company, both resignations effective Jan. 8.

D. Allen Burt, vice-president and treasurer, Wheeling Steel Corporation, has resigned those offices, effective Feb. 1, to become head of the investment and banking house, Howard Hazlett & Son, Wheeling, W. Va. Howard Hazlett, who is a director of the Wheeling Steel Corporation, is retiring from the business which he founded thirty-five years ago and Mr. Burt is taking over his interest and with H. C. Hazlett, will continue the business under his present name. Mr. Burt will remain a director of the Wheeling Steel Corporation and serve the organization in an advisory capacity, retaining his holdings in the company. He has been identified with the steel industry in the Wheeling district for thirty years, starting as an office boy with the old Whitaker Iron Co., Wheeling, in 1892. Six years later he entered the employ of the Aetna-Standard Iron & Steel Co., Bridgeport, Ohio, under John A. Topping, now chairman of the Republic Iron & Steel Co. In 1903, he went with the LaBelle Iron Works, Steubenville, Ohio, as auditor and was successively assistant treasurer, treasurer, vice-president, president and chairman of that company. Mr. Burt had a prominent part in the merger in 1920 of the Wheeling Steel & Iron Co., the Whitaker-Glessner Co. and LaBelle Iron Works into the Wheeling Steel Corporation, of which, upon organization, he was elected vice-president, treasurer and a director.

Howell T. Swift, secretary, Wheeling Steel & Iron Co., and Wheeling Steel Products Co., sales subsidiary, Wheeling Steel Corporation, has resigned and will associate himself with N. J. Higinbotham, formerly New York district sales manager, Wheeling Steel Products Co., who is now president of the Fred Adee Corporation, 5 Cliff Street, New York. Mr. Swift has been chief of the order department of the Wheeling Steel Products Co., and Harry Dobson has been named to succeed him in that position.

The M. A. Hanna Co., Cleveland, which was recently organized as an Ohio corporation to succeed the part-

nership of M. A. Hanna & Co., has completed its organization and the business is now being conducted as a corporation. The personnel and management of the business remain unchanged. The officers are: M. Andrews, chairman of the board; H. M. Hanna, Jr., president; F. B. Richards, William Collins, R. F. Grant, L. C. Hanna, Jr., and G. M. Humphrey, vice-presidents, the above being members of the former partnership; C. N. Osborne, secretary-treasurer; S. W. Folsom and C. W. Brown, assistant treasurers; W. C. Scott, assistant secretary, and L. R. Close, comptroller. The board of directors are: M. Andrews, H. E. Booth, William Collins, Michael Gallagher, R. F. Grant, H. M. Hanna, Jr., L. C. Hanna, Jr., C. N. Hickok, G. M. Humphrey, R. E. McMahon and F. B. Richards.

L. S. Thomson, for several years assistant to J. C. C. Holding, manager of the structural division of the Midvale Steel & Ordnance Co.'s general sales office, Philadelphia, has become an assistant to C. O. Hadly, general manager of sales of the Alan Wood Iron & Steel Co., Philadelphia. Mr. Thomson was for many years with the Carnegie Steel Co. and with the La Belle Iron Works before his connection with the Midvale Steel & Ordnance Co.

Harry Rood, formerly in the Detroit office of the Northern Engineering Works, Detroit, has been appointed New York representative of the company with offices at 30 Church Street. R. A. Byrns and Harrison Daugherty, 120 Liberty Street, New York, who have been representing the Northern Engineering Works for some time, relinquished the agency to devote their entire time to selling for the Towmotor Co., Cleveland.

S. R. Tyler has been elected secretary of the Laclede Steel Co., effective Jan. 1. His first connection with the steel industry was with the Republic Iron & Steel Co., Moline, Ill., and later at various other plants of the Republic company throughout the country. He then became employed in the operating department of Laclede company, and in 1917 was made purchasing agent.

Charles M. Foote, who for many years was identified with the American Tube & Stamping Co., as sales manager, and who recently has served in like capacity with the Columbia Steel Co., is now connected with the Stanford Steel Products Co., Milford, Conn., in an official capacity.

W. W. Etzbach, for the past 15 years in charge of sales in the central states district for the Standard Conveyor Co., St. Paul, has opened offices at 327 South LaSalle Street, Chicago, to handle door hanger equipment, elevator door hangers, spring bearing trucks, steel lockers and shelving.

W. W. Scott, Jr., has been elected vice-president of the Laclede Steel Co., effective Jan. 1. His first experience in the steel business was gained in the Homestead works of Carnegie Steel Co., in the open hearth department, after which he held various mill positions before becoming connected with the sales department of the Carnegie company in Pittsburgh. In 1919 he was made manager of sales of the Carnegie Steel Co., Tennessee Coal, Iron & Railroad Co., and Illinois Steel Co., with headquarters in St. Louis. In the early part of last year he was appointed general manager of sales of the Laclede company.

H. J. Kranz has been appointed assistant general manager of sales of the Laclede Steel Co., with headquarters in St. Louis, effective Jan. 1. He started his business career with the Paddock-Hawley Iron Co., St. Louis, in 1898, and in 1905 became connected with the Carnegie Steel Co.'s sales office in St. Louis. From that time until his connection with Laclede company early in 1922, he was the Kansas City representative of Carnegie Steel Co., Tennessee Coal, Iron and Railroad Co., and Illinois Steel Co.

L. J. Campbell, chairman of the board of directors of the Atlas Steel Corporation, Dunkirk, N. Y., a member of the Electric Alloy Steel Co. and the Atlas Crucible Steel Co., has been elected president, and will serve in both capacities. As president, he succeeds Arthur H. Hunter of Buffalo, resigned. Mr. Hunter has also resigned as a director of the company.

William H. Letchworth, who has been an executive of the Acme Steel & Malleable Iron Co., Buffalo, since 1896, has resigned to accept the position of vice-president and treasurer of the D. H. Millard Co., Inc., manufacturers of farm implements, Buffalo. W. Bryan May has been elected president of the Millard company and the name will soon be changed to the W. B. May Co.

Judson A. Parsons, for several years with the pig iron sales department of the Bethlehem Steel Co.'s New York office, has resigned to engage in the general practice of law in Rochester, N. Y., with offices at 24 Exchange Street. He was graduated from Yale and studied law at Harvard Law School.

F. E. Allen, for the past 12 years sales representative of the Midvale Steel Co. and the Midvale Steel & Ordnance Co. in the Buffalo territory, has resigned. He will act as sales representative for a number of steel manufacturers with offices at 27 Colvin Street, Buffalo.

Prof. Thomas M. Bains, Jr., of the University of California has been appointed assistant professor of mining engineering at the University of Illinois. He will have charge of the coal washing and ore dressing laboratory.

Howard Bruce, president Bartlett-Hayward Co., Baltimore, Md., has been appointed district ordnance chief, by Secretary of War Weeks, and has accepted the appointment.

William A. Furber was elected treasurer of the Bath Iron Works, Bath, Me., at the annual stockholders' meeting held last week.

James A. Farrell, president United States Steel Corporation, was entertained at luncheon at the Maryland Club, Baltimore, Md., on Jan. 10, by Howard Bruce, president of the Bartlett-Hayward Co. John McAuliffe, of Norton, Lilly & Co., New York, and several Baltimoreans, also were guests of Mr. Bruce.

Theodore A. Straub, president, Fort Pitt Bridge Works, Pittsburgh, is back at his desk after an absence of several weeks, due to illness.

E. J. Kulas of the Crouse-Tremaine-Kulas Co., Cleveland, has been made president of the Parish & Bingham Corporation, manufacturer of automobile frames and railroad equipment.

Maj. Gen. Sir A. C. MacDowell, Commandant Canadian Royal Military College and former head Northwest Mounted Police; Charles Piez, president, Link Belt Co., formerly director general U. S. Shipping Board Emergency Fleet Corporation, and T. S. Sisson, vice-president Guaranty Trust Co., New York, are to be the speakers at the annual banquet of the Engineers Society of Western Pennsylvania at the William Penn Hotel, Pittsburgh, Monday evening, Jan. 22. George H. Neilson, president Braeburn Steel Co., will be toastmaster.

COMING MEETINGS

February

American Society for Steel Treating. Feb. 15 and 16. Winter sectional meeting, City Club, Chicago. W. H. Eisenman, 4600 Prospect Avenue, Cleveland, Ohio, secretary.

American Institute of Mining and Metallurgical Engineers. Feb. 19 to 21, inclusive. Annual meeting, Engineering Societies Building, New York. Dr. F. F. Sharpless, 29 West Thirty-ninth Street, New York, secretary.

OBITUARY

A. B. Landis

A. B. LANDIS, who for many years was connected with the machine tool industry, died Dec. 20, from heart failure. Mr. Landis was born in 1854, and learned his trade as a machinist in the shops of Frank F. & Ezra F. Landis of Lancaster, Pa. In 1874 he became a partner of his brother under the firm name of F. F. & A. B. Landis, for the manufacture of small stationary engines and portable steam engines. This business was conducted until 1878, when they sold out to the Geiser Mfg. Co., Waynesboro, Pa. Mr. Landis was for a number of years in charge of the tool department of the Geiser Mfg. Co., Waynesboro, where he developed many new tools and was largely instrumental in introducing interchangeable manufacturing methods. During his connection with the Geiser Mfg. Co., he developed the first Landis grinding machine, which was first used in a commercial way in the shops of the Geiser Mfg. Co. In 1890 a partnership was formed with his brother, Frank F. Landis, under the firm name of Landis Bros., for the manufacture of cylindrical grinding machines. The plant was destroyed by fire on April 25, 1897, but within 24 hours a stock company had been formed under the name of the Landis Tool Co., and a new plant quickly built. Mr. Landis was actively connected with this company until 1910, in the capacity of mechanical engineer and superintendent. The possibilities of his grinding machine were quickly recognized by the trade and the new company expanded rapidly to its present capacity, their product being used throughout the world. In 1903 the Landis Machine Co. was organized to manufacture the Landis threading machine, which tool was originally developed by Mr. Landis. These two companies were largely responsible for the development and growth of the town of Waynesboro.

A. B. LANDIS

In the fall of 1910, Mr. Landis severed his connection with both the Landis Tool Co. and the Landis Machine Co., taking up his residence at Chestnut Hill, Philadelphia, where he opened an engineering laboratory for the development of many inventions, chief among which was a mechanical speed change mechanism for automobiles and machine tools. In the fall of 1919, he organized the firm of A. B. Landis & Sons for the purpose of commercial grinding and development of mechanical ideas. He was actively connected with the business up to the time of his death, which was very sudden.

Mr. Landis was a great reader and a deep student. His education was what he secured from the common schools until he reached the age of 14, after which he was self taught. He was a lover of good music, possessing a fine baritone voice. He lived much for the pleasure of others and his hospitality was enjoyed by many.

DR. NELSON P. HULST, Ph. D., long a prominent figure among Lake Superior mining engineers, died at his home in Milwaukee, Wis., on Jan. 11, at the age of 81 years. He was born in Brooklyn, N. Y., Feb. 8, 1842, and was graduated from Yale in 1867 with B. A. and Ph. D. degrees. He went to Milwaukee in 1870 as a chemist for the old Milwaukee Iron Co. of Bay View, now the Bay View works of the Illinois Steel Co. Dr. Hulst was the first scientific man to operate on the Menominee range. In 1872 he was sent to northern Wisconsin and Upper Michigan for work of exploration in behalf of the Menominee Mining Co., and through the discovery of the famous Pewabic mine was virtually the discoverer of the range and largely responsible for its development. He became president and manager of the Pewabic Mining Co., manager of the Menominee Mining Co. and was an official arm of other corporations exploiting that region. Until the organization of the Oliver Iron Mining Co., in 1896, and its entry to the old ranges in the following year, his professional career was given chiefly to the Menominee, though he held responsible positions elsewhere. When the Oliver company became interested on the Gogebic, to which range its first turned its attention after taking the Mountain Iron Co. of the Mesabi Dr. Hulst was made general manager. He held this position until the advent of the United States Steel Corporation in 1901. He next became vice-president of the Oliver Iron Mining Co. in special charge of geology and exploration, and retained that position until his retirement in 1905.

GEORGE B. SCOVILL, Waterbury, Conn., retired, died suddenly Jan. 8. Mr. Scovill at one time was proprietor of two large Waterbury foundries and a conspicuous figure in the foundry industry of his State.

FREDERICK E. WALDEN, Worcester, Mass., founder of the Walden Mfg. Co., which is now Walden-Worcester, Inc., also founder of the Bay State Wrench Co., a member of the firm of Boston Wrench Co., at one time president of the old New York firm, Tower & Lyon Hardware Co., and the inventor of the first wire handle ratchet wrench and many other tools, died of heart trouble on Jan. 10, at his home in Worcester, in his 56th year.

ALBERT H. MILLER, chief metallurgist of the Nicetown works of the Midvale Steel & Ordnance Co., died suddenly at his home at Ambler, Pa., on Thursday, Jan. 11. He was 43 years old. Mr. Miller was a graduate of the University of Pennsylvania and entered the employ of the Midvale company in 1901, and had been connected there continuously up to the time of his death. He was known as an expert in steel analysis.

JOHN JORDAN, formerly president of the Williams Tool Co., Erie, Pa., died in his home in that city on Jan. 11. He was born in Sharon, Pa., 58 years ago and went to Erie with his family about 1902. For 17 years he was president of Williams Tool Co., retiring when it was merged with the Williams Tool Corporation. He was a prominent figure in Erie financial circles.

BENJAMIN G. JONES, Arlington, Mass., a manufacturer of steel ball bearings, died suddenly on Jan. 12, at Reading, Mass., in his 58th year.

OLIN M. CAWARD, general manager Caward-Gaskill Furnace Corporation, Chicago, died in that city on Jan. 10 after a brief illness. Mr. Caward was 46 years of age and was founder of the company, which manufactures oil-fired metallurgical furnaces.

ALBERT KRETLOW, for many years purchasing agent of the Great Lakes Engineering Co., died at Ford General Hospital, Detroit, Jan. 5. Mr. Kretlow was a director of the Purchasing Agents' Association of Detroit.

Stimulated by the recent order of the Interstate Commerce Commission, that 49 of the principal railroads install automatic train-control devices, orders obtained lately by the General Railway Signal Co., Rochester, N. Y., have so swollen as to indicate one of the busiest seasons in the history of the company. Working forces have been greatly increased not only in the plant but in various parts of the country in order to push installation work. Large orders have been received from roads both here and abroad. Electric interlocking plants have been ordered by the Philadelphia & Reading, the Ann Arbor Railroad and New York Municipal Railways.

BOOK REVIEWS

Burning Liquid Fuel. By William Newton Best. Pages 341, 6 x 9 in.; illustrations, 316. Published by U. P. C. Book Co., 239 West Thirty-ninth Street, New York. Price, $5.

The late Doctor Best's personality is seen all through this book. It really is not a treatise on the subject, but private talk with the author, whose experience and achievements are too well known to be further emphasized. Starting as a pioneer in the last decade of the past century, the author's experience covered practically his whole life and the various chapters reflect his activities in the various industries. Actual shop drawings are published in a profuse way, and that makes the volume of great practical value. No space is lost in theorizing or discussion, but positive facts are published without fear and with evident openmindedness.

To the iron and steel man, the chapters on open-hearth and heating furnaces, malleable iron and foundry furnaces, forge fires, etc., are of particular interest and they will be consulted with great benefit.

It must be pointed out that no comparisons are made with other equipment or burner constructions. This is rather an advantage. The definiteness of the data and results present to readers and students a solid foundation for making their own comparisons without being handicapped by bias of the author.

In the presence of the economic conditions of today, this volume is of unusual value. The high price of coal, its scarcity and inadequate distribution will inevitably increase the industrial importance of fuel oils, at least in territories close to seaports. Therefore Doctor Best's experience should be welcomed by many engineers who are confronted by new applications of oil-burning problems and those who are considering switching to the liquid fuels by the compelling force of economic circumstances. J. F. S.

American Malleable Cast Iron. By H. A. Schwartz. Pages 416, 6 x 9 in.; illustrations, 190. Published by the Penton Publishing Co., Cleveland. Price, $7.

This book speaks for itself. It is the result of an effort to present an up-to-date, comprehensive treatise on the malleable cast iron industry of the United States. Mr. Schwartz has succeeded well. The style is clear and the material is presented in a concise, matter of fact form that makes reading a pleasure. The index and exhaustive bibliography are valuable to students looking for further information.

The first chapters are most interesting from the historical standpoint and bring out the achievements and contributions, not only of Seth Boyden, the father of the malleable iron industry, but of the pioneers of the past century. The value of cooperation and research is also emphasized and due credit is given to the recognized experts of the day.

No doubt the author is actively connected with the industry because he has worked out the sequence of his chapters with care and with the spirit of a man who not only likes his profession but likes to teach and to diffuse exact information about processes and products.

The drawings of the typical air furnace are rather poor and the chapter of furnace design is not treated as its full importance warrants, but operating data are given in generous measure, including those of electric furnace melting. The annealing practice is covered in all its details and the improvements with the continuous kiln-type tunnel furnaces are discussed and an outline of the ultimate possibilities in fuel economy is given. Several remarkable metallographic pictures are reproduced to illustrate the precise effects of the process.

Chapters on pattern making and drawing are followed by over a hundred pages covering the inspection and testing of the finished product from all angles, serving to explain the remarkable deformation properties of the malleable cast iron.

The book does not need to be indorsed and recommended because in the presentation of its subject it is self-sufficient. Those who seek information concerning this important branch of the iron and steel industry will welcome the publication, which has filled a long-felt want. J. F. S.

Fuel Oil in Industry. By Stephen O. Andros. Pages 198, 5¾ x 9 in.; illustrations, 95. Published by Petroleum Extension University, Citizens Trust Building, Fort Wayne, Ind. Price, $3.75.

The increasing importance of liquid fuel to all industries is responsible for this volume and the subject is presented in a broad, general way. It is a birdseye study of all the problems connected with fuel oil of interest to the beginner and trader, but of little value to the engineer who is looking for detail information or required to solve specific questions. The iron, steel and metal working industries are mentioned only casually and little attention is paid to their manifold applications for fuel oil. J. F. S.

"A Comparison of British and American Foundry Practice," with special reference to the use of refractory sands, is the subject of a pamphlet of 106 pages by P. G. H. Boswell of the University of Liverpool, England, and published by the University Press of Liverpool, Ltd. Chapters are devoted to Metallurgical Practice and Foundry Technique, the Casting of Metals and Alloys, Desiderata in Molding Sands, Refractory Sands for Metal Founding in America, Bonding of British and American Molding Sands; Silica Sands for Furnace Hearths and a General Review and Summary. Frequent references to American practice are included. There are tables covering chemical analyses of sands, mechanical analyses of sands and mineralogical composition of sands, as well as nine graphical representations of various subjects. Price, 4s. 6d. net.

New Books Received

American Machinist Gear Book. By Charles H. Logue. Pages 353, 5¾ x 9 in.; illustrations 273. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. Price, $3.

Structural Drafting and The Design of Details. By Carlton Thomas Bishop. Pages 352, 10½ x 7⅝ in.; illustrations 169. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, $5.

Grinding—Wheels, Machines, Methods. By executive and technical staffs of the Norton Co. Pages 387, 5 x 7½ in.; illustrated. Published by Norton Co., Worcester, Mass. Price, $1.

The Flow of Gases in Furnaces. By W. E. Groume-Grjimailo. (Translated by A. D. Williams.) Pages 399, 6 x 9 in.; illustrations 194. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York. Price, $5.50.

Locomotive Cyclopedia of American Practice. Pages 1155, 8¼ x 11½ in.; illustrations 2740. Compiled and edited for the American Railway Association. Published by Simmons-Boardman Publishing Co., Woolworth Building, New York. Price, $8.

Car Builders' Cyclopedia of American Practice. Pages 1192, 8¼ x 11½ in.; illustrations 3101. Compiled and edited for the American Railway Association. Published by Simmons-Boardman Publishing Co., Woolworth Building, New York. Price, $8.

Proceedings of American Society for Testing Materials. Two volumes; part I, committee reports, new and revised tentative standards; part II, technical papers. Pages, part I, 1023, part II, 591, 6 x 9 in., illustrated. Published by the American Society for Testing Materials, 1215 Spruce Street, Philadelphia.

Steel Thermal Treatment. By John W. Urquhart. Pages 336, 5½ x 9 in.; illustrations 136. Published by D. Van Nostrand Co., 8 Warren Street, New York, Price, $8.

Elasticity and Strength of Materials Used in Engineering Construction. By C. A. P. Turner. Pages 85, 6 x 9 in.; illustrated. Published by C. A. P. Turner, Minneapolis, Minn Price, $5.

Plans of New Companies

The Keller Mechanical Engineering Corporation was recently chartered to take over the business of the Keller Mechanical Engraving Co., 70 Washington Street, Brooklyn, N. Y., increasing its capital from $425,000 to $550,000, all but $50,000 of which has been issued. Orders on hand have so increased and present floor area is so crowded that additional space has been obtained in the Sweeney Building on the opposite side of the street. Some months ago the management considered the construction of a plant, but plans were put aside in an effort to keep abreast the demand. Eventually it will most likely become imperative to reconsider building. Two new machines, a flexible shaft grinder and a stamp making machine, have been added to the company's line, besides the Type F die sinking machine exhibited in Detroit last October. In the reorganization Sidney A. Keller, formerly president, becomes treasurer and general business manager. Joseph F. Keller is president in charge of works and developments; Jules Dierckx, vice-president and sales manager; L. A. Tanzer of the firm, Tanzer & Lane, New York, secretary; and E. A. Anderson, assistant secretary.

The Brighton Dry Dock Co., West New Brighton, S. I., has been incorporated with capital stock of $250,000 and will engage in operating a shipbuilding and repair plant, its activities being confined to small craft. F. E. Stripe, 220 Broadway, New York, is counsel for the company. The incorporators are M. E. Saunders, A. W. Osborn and J. O. Connor.

The Universal Rotary Soil Cultivator Co., 220 Broadway, New York, was recently incorporated with capital stock of $100,000, to manufacture soil cultivating machines, tedders, seeders, plows, and other farm implements. The principals of the organization are A. Pinzon and N. D. Fazia.

The Samson Crane Co., care of H. M. Fertig, 277 Broadway, New York, has been incorporated to manufacture engines, boilers, etc. Plans for the future are still indefinite but it is most likely that operation will not be on a large scale for some months. The incorporators are J. Collins, F. Wengraf and J. J. Garten.

The Superior Gum Vending Machine Corporation, 825 West 180th Street, New York, was recently incorporated with capital stock of $50,000, and will engage in manufacturing vending machinery. No definite plans for future operation has been arrived at as yet. The incorporators are I. Dorf and R. Small.

The American Steel Co., with plant to be located at American Street, Philadelphia, has been formed by Joseph N. Dalsen, Carl W. Locher, and Harry C. Cox, Jr. The company will manufacture plain and fabricated steel.

The Barclay Mfg. Co., 38 Park Place, New York, has been incorporated with capital stock of $25,000 and will engage in manufacturing automobile equipment. A temporary office is located at the above address, but operation will have to await further development in organization. The incorporators are M. Wilson and M. Levine.

The Tozer Engine & Iron Works, successor to the Tozer Engine Works, 601-615 Green Street, Columbia, S. C., has been formed to take over the business and properties of the Tozer company and will continue the business as formerly, manufacturing portable, semi-portable, and stationary engines, flues, engine parts, castings, etc. T. F. Dial is vice-president.

The Standard Turbine Co. Wellsville, N. Y., which was recently incorporated, has leased the Charles Youngs machine plant, that city, until a new factory can be erected on a site in the Proctor district, just outside of Wellsville. Additional equipment has not been contracted for as yet but will be placed in the near future. Heretofore, some of the larger machine work was let out to contract, but under the new arrangement the company will try to do all its own work. Its authorized capital is $125,000, $25,000 of which is preferred stock. The officers of the company are: president, J. Y. Dahlstrand; vice-president and treasurer, E. C. Brown; and secretary, Richard Gardner. Construction of the new plant is expected to begin in April.

Properties of the Federal Adding Machine Co. of New York were bought at receivers' sale by a company of stockholders represented by C. F. Leng, 42 Broadway, N. Y. A new company was organized to be known as the Federal Adding Machine Co., Inc., with capital stock of 25,000 shares, no par, to continue the business of the old company.

The Huggins Tool Co., 246 Congress West, Detroit, has been incorporated with capital stock of $90,000 and will manufacture tools and special machinery, having taken over a business manufacturing tools, dies and gages, which previous to Dec. 7 was a partnership. All necessary equipment and material is on hand and the business will be conducted as formerly. The incorporators are: William M. Huggins and Edward J. Ruelle.

The Buck Supply Co., care of S. W. McGinness, Berger Building, Pittsburgh, has been organized by J. W. Kennedy and J. R. Brose to manufacture electrical and mechanical equipment, but immediate activities will be confined to handling automotive supplies.

The Dodson-Morgan Corporation, 2500 North Ninth Street, St. Louis, recently chartered under Missouri laws with capital stock of $100,000 preferred and 2500 shares, no par, common, will engage in the manufacture of iron and steel products. All manufacturing will be done under contract for the present. The principal products will be shock absorbers, bumpers, fender braces, tie rods, and mud cleats. The officers of the company are: George Dodson, president; F. W. Morgan, vice-president; Harry B. Morgan, vice-president and general manager; W. L. Meyer, treasurer; and George Dodson, Jr., secretary.

The Frank E. Wolcott Mfg. Co., Hartford, Conn., has secured a charter to manufacture electrical equipment and appliances, authorized capital being $50,000. The incorporation is a continuance of the business previously conducted by Mr. Wolcott. At present part of the work is let out to contract. Plans are under way to provide for broadening the present activities. The principal incorporators are: Frank E. Wolcott and C. W. Church.

The Egg Machinery Co., Inc., 7 East Forty-second Street, New York, has obtained a New Jersey charter with authorized capital of $25,000, to manufacture egg-separation machines and parts. No plans have been decided upon for future manufacturing. The incorporators are: Clarence W. Webb, Hans H. A. Meyn, and James M. Carples, secretary.

The Equitable Powder Mfg. Co., care of Frederick Seymour, 165 Broadway, New York, has been incorporated under Delaware laws with capital stock of $2,000,000 and will engage in the manufacture of explosives. The incorporation is the continuance of a completely organized company and business will be conducted as formerly.

The Eastern Steel Castings, Inc., Newark, N. J., which has acquired the plant constructed in that city by the American Brake Shoe & Foundry Co. for the manufacture of motor castings for the Willys Corporation, has been incorporated with capital stock, consisting of 20,000 shares, no par value. Most of the equipment required has been contracted for or is already in use by the Bayonne Steel Casting Co., which later will be taken over by the Eastern Steel Castings Co. The incorporators are: John B. Brown, Robert D. Reynolds and William D. Sargent, Oak Street, Bayonne, N. J.

Trade Changes

James A. Condon, Inc., has taken over the business formerly conducted at Third and Arch Streets, Philadelphia, by Howard W. Read. The new company, which will specialize in steam, electrical and contractors' equipment, is headed by James A. Condon, who for 21 years was with Frank Toomey, Inc. Mr. Condon's long experience makes him thoroughly conversant with dynamos, motors, pumps, air compressors, boilers, engines and their accessories, including gaskets, grate bars, etc. The company has a warehouse at 1114 Frankford Avenue. Mr. Read will continue to have his office at the same address.

The partnership existing between W. Nelson Mayhew, Samuel Frank and Joseph N. Dalsen, trading under the name, Montgomery Iron & Steel Co., 918 West Berks Street, Philadelphia, has been dissolved. Hereafter the business will be conducted by Mr. Mayhew and Mr. Frank under the same name and at the above address. The company announces the following appointments: for fabricated steel, G. S. Rowbotham, F. A. Russ and J. A. Gannon; for plain material, L. R. Welsh; for ornamental iron work, fire escapes, etc., A. F. McCarty.

The American Brass Products Co., with general offices at 2302 Woolworth Building, New York, announces the change in its name to United States Brass Products Co. The management and business will be continued, in the same manner as in the past.

J. S. Rose and H. R. Spandel have been appointed managers of the Anglo-American Industrial Diamond Co., Inc., 14 West Fortieth Street, New York, which will distribute in the United States, industrial diamonds from the Anglo-American Industrial Diamond Co., Bristol House, Halborn Viaduct, London, E. C. 1, England.

The Union Mfg Co., New Britain, Conn., manufacturer of chucks, has opened a store at 25 South Jefferson Street, Chicago, where it will carry a large stock of different sizes of chucks. The store will be in charge of H. S. Huncke, who has been appointed representative in the Middle-West territory. This territory was formerly covered direct from the factory by the late Marcellus L. Burley.

Machinery Markets and News of the Works

PRICES ARE ADVANCING

Machine-Tool Builders in Many Instances Announce New Lists

Automobile Manufacturers in Detroit District Buying Automatic Machines—Heavy Tool Demand in Cincinnati

A number of advances in prices of machine tools, conspicuous among which is a rise of 5 to 15 per cent on planers, have been made by machine-tool builders. It is predicted that other makers will announce new prices effective Feb. 1.

Demand for machine tools so far this month has not reached the momentum which was expected of it, but in some centers buying is on a scale at least equal to that of December and in some instances business has gone ahead of December. Cincinnati tool builders note an especially good demand for heavy tools, while in the Detroit district automatic machines of various types are in demand. The Ford Motor Co. is inquiring for about a dozen of such machines and inquiries from other Detroit automobile companies make a total of 25 or 30 automatics, for which orders will shortly be placed.

The expectation that 1923 will go ahead of 1922 in the demand for automobiles causes the machine-tool trade to expect that considerable business in tools will be forthcoming from the automobile industry.

Railroad buying is not as important as it has been in recent weeks, but orders are coming from various roads each week. The Louisville & Nashville has closed on its list, buying four engine lathes, one planer and one boring mill. Action is expected on the Big Four list this week. The Chicago, Milwaukee & St. Paul has purchased a number of rebuilt tools. The Chicago, Rock Island & Pacific is asking for prices on two tools and is expecting to inquire for other machines soon. A list of tools for the Conway shops of the Pennsylvania Railroad is reported to have been made up and will probably be sent out for prices within the near future.

New York

NEW YORK, Jan. 16.

THE machine-tool trade looked for more active buying in January, but so far this month orders have about kept pace with the December sales records. The past week has been lacking in special feature. While buying has been in fair volume, it has originated from a considerable number of scattered sources. The Otis Elevator Co. has closed for perhaps a dozen tools, some of which will go to its Chicago plant. The General Electric Co. remains an important factor in the market, and its buying during the year is expected to be liberal. Some price advances have been announced and others are expected about Feb. 1.

The crane market is quiet in this district from the standpoint of orders, but there are a fair number of current inquiries for electric overhead cranes and some activity in locomotive cranes.

Among the current inquiries on electric cranes is one from the Selbach & Meyers Co., 601 Twenty-second Street, West New York, N. J., calling for bids on a 10-ton, 74-ft. span overhead traveling crane. Clinton E. Hobbs Co., 33 Pearl Street, Boston, dealer, has been receiving bids on a 10-ton crane for an unnamed purchaser. I. L. Chadwell, consulting engineer, Mt. Pleasant, Tenn., is asking for a 10-ton, 50-ft. span electric traveling crane and a clam-shell bucket, preferably used equipment. The Anaconda Copper Mining Co., 25 Broadway, New York, is reported to be receiving bids on small cranes. The General Electric Co. has received estimates on a 60-ton, 15-ton and a 5-ton overhead traveling crane for use in making up an appropriation for equipment for the West Lynn shops. The formal inquiry has not yet been issued. The Phoenix Utility Co., 71 Broadway, New York, is accepting bids on a 60-ton and a 20-ton overhead traveling crane. The J. G. White Engineering Corporation, 43 Exchange Place, New York, is expected to close some time next week on its recent inquiry for a 30-ton overhead traveling crane. The three 5-ton overhead traveling cranes reported to have been purchased by E. W. Bliss & Co. from the Shaw Electric Crane Co. are stated to have been abandoned. Among recent purchases are:

General Electric Co., Schenectady, N. Y., a 30-ton, 4-motor, 55-ft. 3-in. span, overhead traveling crane from the Champion Engineering Co.;

Delaware, Lackawanna & Western Railroad, a 125-ton and 15-ton overhead traveling crane for its Kingsland shops, Kingsland, N. J., from the Shaw Electric Crane Co.;

Quebec Development Co., Charlotte, N. C., 18 100-hp. hoists and 12 derricks from the American Hoist & Derrick Co. for use on the Saginaw River hydroelectric power project in the Province of Quebec, Canada. Included in the equipment still pending are four 25-ton locomotive cranes for this project;

National Radiator Co., Johnstown, Pa., two 3-ton and a 5-ton electric traveling crane from the Milwaukee Electric Crane & Mfg. Co.;

Chain Belt Co. Milwaukee, special 10-ton overhead traveling crane from the Milwaukee Electric Crane & Mfg. Co.;

Canadian National Railways, Toronto, Ont., two 160-ton and one 150-ton wrecking crane from the Industrial Works;

Pickands, Mather & Co., Cleveland, two 40-ton, 50-ft. boom locomotive cranes equipped with two yard buckets for use in Minnesota, from the Industrial Works;

New York, New Haven & Hartford Railroad, a 40-ton, 2-motor overhead crane trolley from the Northern Engineering Works;

General Electric Co., Erie, Pa., a 5-ton and 10-ton, 35-ft. span, 3-motor, overhead traveling crane from the Northern Engineering Works;

American Rolling Mill Co., eight 15-ton, one 20-ton and one 50-ton overhead traveling cranes for its Ashland plant, from the Morgan Engineering Co.

The Empire Tinware Co., 33 South Fifth Street, Brooklyn, is taking bids on a general contract for a four-story addition, 100 x 125 ft., to cost about $35,000. Improvements will also be made in the present works. William I. Hohauser, 116 West Thirty-ninth Street, New York, is architect.

The Pan-American Petroleum & Transport Co., 120 Broadway, New York, has acquired 120 acres in the new Smackover oil field, Ark., and contemplates the immediate installation of a storage and distributing plant, consisting of 22 steel tanks, each with capacity of 80,000 bbl., power house, pumping plant, machine shop, and other structures. Edward L. Doheny is chairman of the board.

The Vacuum Oil Co., 61 Broadway, New York, has acquired water front property on the East River, between Tenth and Eleventh Streets, comprising a portion of the former plant of the Quintard Iron Works, and will use the site for a new storage and distributing plant. The machinery installation will include mechanical ship-loading and conveying equipment.

The F. L. Smithe Machine Co., Eleventh Avenue and Twenty-first Street, New York, has commissioned Walter M. Cory, 30 Church Street, consulting engineer, to prepare plans for a five-story plant, 127 x 215 ft., at Twelfth Avenue and Forty-fourth Street. It will be equipped for the manufacture of paper and envelope-making machinery and parts. F. L. Smithe is head.

H. Medalie, New York, operating a machine shop at 908 Stebbins Avenue, is planning the installation of a number of machine tools, including lathes and milling machines.

Jacob A. Rappaport, West and Milton Streets, Brooklyn, manufacturer of metal doors and sash, has removed his plant to the building at 77-103 Dobbin Street, where increased facilities will be provided.

The W. H. Weaver Co., Sackets Harbor, N. Y., operating a general machine works, is planning for the installation of additional equipment, including electrically-operated rod-bending machinery.

The Star Fuse Co., Inc., 168 Centre Street, New York, has inquiries out for two 20 kw., 125-volt generators, and auxiliary apparatus.

The Dickinson Cord Tire Corporation, 220 West Nineteenth Street, New York, has leased a floor in the Blickman Building, Mount and Manley Streets, Long Island City, totaling about 20,000 sq. ft. of floor space, for a new plant to manufacture automatic machinery for cord tire production. T. S. Dickinson is president.

A manual training department will be installed in the new high school to be erected at Saratoga, N. Y., estimated to cost $200,000, for which revised plans are being drawn. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

The Western Electric Co., 195 Broadway, New York, has purchased 55 acres on the Kearny meadows, Kearny, N. J., as a site for a new plant. Plans for the initial units, to be devoted primarily to the manufacture of wire and cables, will be prepared at once. The structures are estimated to cost $500,000, with machinery, and will give employment to about 1000 persons. The new works will be used as an Eastern branch of the main plant at Hawthorne, Ill.

The Public Service Corporation, Public Service Terminal, Newark, N. J., will commence enlargements at its power plant at Burlington, N. J., to increase the capacity to 37,000 kw.

The Perseverance Paper Mill Co., Lambertville, N. J., is perfecting plans for rebuilding its plant, recently destroyed by fire with loss in excess of $50,000, including machinery. Henry Weeks is general manager.

A manual training department will be installed in the two-story and basement high school, 90 x 125 ft., to be erected at Bordentown, N. J., estimated to cost $150,000, for which bids will be asked early in the spring. Former bids have been rejected. The Fowler Seaman Co., Broad Street Bank Building, Trenton, N. J., is architect.

The New Jersey Power & Light Co., Dover, N. J., has acquired the plant and property of the Washington Electric Co., Washington, N. J. Immediate possession will be taken and extensions and improvements made. New transformers and other electrical equipment will be installed.

The Twin Piston Ring Corporation, West Orange, N. J., recently organized, has leased property at 227-29 High Street, Newark, for a new plant to manufacture piston rings from special castings made by a centrifugal process. The present West Orange works will be removed to the new location and enlarged. Robert A. Bachman, formerly vice-president and general manager Edison Storage Battery Co., West Orange, is president of the new company; A. William Almquist, previously connected with Thomas A. Edison, Inc., of the same place, is vice-president, and Frank D. Reeve, treasurer.

Charles P. Gillen, director of Parks and Public Property, City Hall, Newark, will receive bids until Jan. 24 for mechanical and electrical equipment for the new municipal Centre Market, now in course of construction, including electric generating plant; boiler plant and steam piping; refrigerating plant; elevator equipment, and ventilating apparatus. George B. Hooper and Frank Grad, 116 Market Street, are associated architects.

The Gordon B. Phillips Sales Co., 71-73 Central Avenue, Newark, local representatives for the Haynes automobile, has leased the building at 23-25 Sussex Avenue and will use the entire structure for a service and repair works, and parts department, including assembling.

New England

BOSTON, Jan. 16.

MACHINE tool business booked in this section the past week largely concerned used equipment and the aggregate value was comparatively small. It included shapers, upright drills, multiple and single spindle sensitive drills, 14-in. and 16-in. lathes, and miscellaneous other machines, purchased by various plants throughout New England. No special significance can be attached to this business, the buying representing merely a rounding out of existing plant equipment. Sales of new tools were very few and far between, and but one small crane, a 5-ton electric Niles, figured in the week's transactions.

Small tools and machine tool parts are increasingly active. Individual orders booked in some instances are larger than any received in more than a year, while the aggregate number of orders coming in exceeds that of any corresponding period in 1922.

The encouraging feature of the situation is that the anticipated revival of activity is appearing. The Edson Mfg. Co., South Boston, steering wheel gears, is inquiring on about $10,000 worth of production and tool room equipment, the Pratt & Cady Co., Hartford contemplates the purchase of a fairly large amount of equipment, mostly production tools. Massachusetts interests are considering the purchase of $30,000 to $40,000 worth of machine tools, both production and tool room; inquiries are out for heavy boring mills of the 16-ft and 10-16-ft. type, and transportation companies are inquiring for 2 ft. and 4 ft. radial drills. These are a few of the prospects showing real life. Inquiries are about evenly divided between new and used equipment. Although not coming within the classification of active prospects, makers of textile machinery have made inquiries on automatic lathes.

A Westerley, R. I., firm is asking bids on a 20-ton, 30-ton and 40-ton crane, but will purchase only one.

A Lowell, Mass., old material dealer has purchased the remaining equipment and stock of the Metz Co., Waltham, Mass., automobiles, the price being in excess of $100,000. The company previously sold approximately $40,000 worth of its machine tool equipment and is in the final stages of liquidation.

Contract has been awarded by the Parker Wire Goods Co., 18 Grafton Street, Worcester, for a one-story addition to cost approximately $75,000.

The American Metal Hose Co., 67 Jewelry Street, Waterbury, Conn., contemplates the erection of a three-story 60 x 96 ft. addition to cost about $150,000.

The plant of the Hoosac Lumber Corporation, Heartwellville, Vt., wood-working, recently was destroyed by fire. Within the previous two weeks $12,000 worth of new equipment had been installed and the total loss is estimated at $50,000. The company will rebuild.

The Noyes-Buick Co., Boston, has purchased a site on Orchard Street, East Hartford, Conn., and will shortly erect a 70 x 100 ft. brick and concrete general distribution plant and machine shop.

A manual training department will be installed in the high school to be erected on North Main Street, Middleboro, Mass., estimated to cost $100,000. E. I. Wilson, 109 State Street, Boston, is architect.

The Central Machine Works, 19 Church Street, Worcester, Mass., has acquired the plant and business of the John J. Adams Machine Co., 87 Mechanic Street, and will consolidate the plants at the latter address.

The Uncas Paperboard Co., Norwich, Conn., has been organized with a capital of $1,500,000 to take over and operate the plant of the Ironsides Board Corporation, recently acquired at a public sale by James E. Smith, an official of the Chesapeake Paper Board Co., Woodall Street, Baltimore, and who will head the new organization. The plant will be remodeled and additional equipment installed.

The Lake Sunapee Power Co., Rutland, Vt., I. M. Frost, president, will proceed with the erection of its new hydro-electric power plant at Sunapee Harbor, N. H., estimated to cost $300,000, with machinery.

The Stamford Gas & Electric Co., Stamford, Conn., will build a new three-story electric switching and distributing plant to cost $55,000.

A manual training department will be installed in the three-story high school to be erected at Adams, Mass., for which excavations are under way. The Frank Irving Cooper Corporation, 172 Tremont Street, Boston, is architect.

The Board of Directors, Yale University, New Haven, Conn., will build a one-story power house on Rose Street, 55 x 70 ft., estimated to cost $200,000. Day & Klauder, 1416 Chestnut Street, are architects.

A manual training department will be installed in the proposed new high school to be erected at Weymouth, Mass., for which H. B. S. Prescott, 12 Pearl Street, Boston, is architect.

The Connecticut Light & Power Co., Milford, Conn., has foundation work under way for the initial units of its new generating plant at New Milford, estimated to cost $750,000.

The Standard Electric Time Co., 81 Logan Street, Springfield, Mass., manufacturer of self-winding clocks, etc., is preparing plans for three additions, one three-stories, 50 x 90 ft., and two one-story, 50 x 50 ft. and 30 x 50 ft. respectively.

The work will cost about $100,000. H. L. Sprague, 310 Main Street, is architect.

The Wico Electric Co., Liberty Street, Springfield, Mass., manufacturer of magnetos, etc., expects to break ground in March for the second unit of its new plant at West Springfield. Work on the first unit, 90 x 400 ft., will be completed and occupied by that time. On vacating the present factory the American Electric Service & Maintenance Co., occupying adjoining property, will take over the plant and use it for extensions, improving the structure and installing additional equipment, Edward L. Stoughton is treasurer of the Wico company, and A. M. Scofield general manager of the American Electric organization.

The Hendee Mfg. Co., Springfield, Mass., has purchased the plant and business of the Harley Co., of the same city, manufacturer of castings and drop forgings, at a foreclosure sale for $625,000.

Baltimore

BALTIMORE, Jan. 15.

CONTRACT has been awarded by the Tin Decorating Co., Boston Street and Linwood Avenue, Baltimore, manufacturer of metal products, to the West Construction Co., American Building, for a one-story addition, 106 x 168 ft., to cost $45,000.

The Maryland Motors, Inc., 607 St. Paul Street, Baltimore, has leased a two-story building, 98 x 110 ft., to be erected at 414-24 North Calvert Street, by Poe & Davies, Standard oil Building, to cost $55,000, for the establishment of a service and repair plant.

The Baltimore Ice Mfg. Co., 651 West Baltimore Street, Baltimore, will take bids in February for its proposed one-story ice-manufacturing plant at Lexington and Lewis Streets to cost $130,000. G. A. Beard is president.

The Bureau of Supplies and Accounts, Navy Department, Washington, will take bids until Jan. 23 for a quantity of electric wire and cable for use at Eastern navy yards, as set forth in Schedule 416; also for 1796 pipe wrenches, Schedule 431.

The Carolina Power & Light Co., Raleigh, N. C., is planning the construction of a new one-story power house near the State Hospital, to cost $75,000.

The Stonewall Ice Co., Greenville, S. C., will commence the erection of a new one-story ice-manufacturing plant, 50 x 200 ft., to cost approximately $45,000. All machinery will be electrically operated. John B. Marshall is head.

The American Woodworking Corporation, Baltimore, has awarded contract to Louis O. Hildebrand, 100 West Hamilton Avenue, for a two-story plant, 70 x 302 ft., on Sisson Street, to cost $20,000, exclusive of machinery.

The Baltimore & Ohio Railroad Co., Baltimore, will take bids in February for a two-story pattern shop at Mont Clair, near Baltimore, estimated to cost $25,000. M. L. Kimball is company engineer.

The United States Shipping Board, Washington, D. C., is arranging for an appropriation of $5,000,000 to $6,000,000 for structural and machinery improvements and changes in 23 post-war American passenger vessels and a number of merchant steamers, to include the installation of new generators, electric lighting sets, gearing, engine and pumping machinery, condensers, revolving parts, etc.

The Seaboard Air Line Railway Co., Norfolk, Va., has acquired property at Charleston, S. C., and has tentative plans for the construction of new locomotive repair shops.

The American Ice Co., Calvert Building, Baltimore, will commence the erection of a new one and one-half story ice-manufacturing plant on Eden Street, 72 x 84 ft., estimated to cost $50,000. C. Leslie Weir, architect and engineer for the Knickerbocker Ice Co., 45 East Forty-second Street, New York, has prepared plans.

H. R. Story, town clerk, Gibsonville, N. C., has been authorized to purchase a motor-driven centrifugal pump with capacity of 750 gal. per min.

L. G. Morris, R. F. D. No. 2, Ashland, Va., operating a wheelwright plant, is planning for the installation of additional equipment, including drill, combination band saw, bench tools, etc.

The Virginia Motors, Inc., Lynchburg, Va., organized under Delaware laws with a capital of $1,000,000, has taken over the plant and assets of the Piedmont Motor Car Co. Extensions and improvements will be made and operations resumed at an early date.

The Delaware Light & Ice Co., Selbyville, Del., plans for the immediate rebuilding of its electric light and ice-manufacturing plant, destroyed by fire Jan. 8 with loss estimated at $75,000.

The Andrews Container Co., Greensboro, N. C., recently organized with a capital of $150,000, has leased a local building and will commence the installation of machinery to manufacture fiber and corrugated containers, folding cartons, etc. O. B. Andrews is president.

The Georgia Brick Co., Athens, Ga., has arranged a list of machinery for installation at its proposed plant. The equipment will be electrically operated, with initial capacity of about 30,000 brick per day. Robert C. Wilson and H. H. Hinton head the company.

J. C. Steele & Sons, Stateville, N. C., manufacturers of brick-making machinery, etc., have inquiries out for an 80 to 100-hp. boiler, and 150-hp. Corliss engine, with auxiliary power equipment.

The Ford Motor Co., Ponce de Leon Avenue, Atlanta, Ga., is completing plans for extensions in its assembling plant and will install equipment to increase the production from 150 to 225 completed cars per day.

The Commercial Envelope Co., 2400 Frederick Avenue, Baltimore, is planning to rebuild the portion of its plant destroyed by fire Jan. 5, with loss estimated at $50,000, including equipment.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, is in the market for an electrically operated shearing machine for cutting scrap iron, rounds and squares.

The Common Council, Oakland, Md., is planning for the installation of electrically operated pumping machinery at the municipal waterworks, in connection with other improvements.

Philadelphia

PHILADELPHIA, Jan. 15.

THE Baldwin Locomotive Works, 500 North Broad Street, Philadelphia, is completing plans for a new machine shop and foundry at its Eddystone plant, estimated to cost $1,000,000. The new structures will be used exclusively for the production of engine tenders, and considerable work now being handled in this line at the Philadelphia plant will be transferred to the new shops. Samuel M. Vauclain is president.

Stanley G. Flagg & Co., 1421 Chestnut Street, Philadelphia, operating an iron and steel fabricating plant, will establish a new works at Stowe, Pa.

Motors and other electric power equipment, conveying machinery, etc., will be installed in the seven-story, reinforced-concrete plant, 95 x 275 ft., to be erected at South Bainbridge, Swanson and Water Streets, Philadelphia, by the American Bag & Paper Co., Second and Vine Streets. Bids on a general contract are being received until Jan. 23. Clarence E. Wunder, 1415 Locust Street, is architect.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Jan 30 for 450 gross of hexagon steel nuts, 200,000 castellated nuts, and 650 gross of brass hexagon nuts, for use at the aircraft factory, Philadelphia, as specified in Schedule 420; also for storage batteries in lots of 6, 25, 50, 100 and 200, in Schedule 421; and for 1156 padlocks for the Philadelphia Navy Yard, Schedule 435.

Fire, Jan. 7, destroyed a portion of the plant of John Maneely, 247 North Twelfth Street, Philadelphia, on D Street, manufacturer of iron pipe and fittings, with loss estimated at $100,000, including equipment and stock. It is planned to rebuild.

The Pennsylvania Brick & Tile Co., Philadelphia, has been chartered under State laws to construct and operate a plant at the foot of Westmoreland Street and the Delaware River for the manufacture of cement brick. Contract has been awarded to the Cemprod Engineering & Construction Co., Bulletin Building, for the initial unit. The works will be equipped for a capacity of 150,000 brick per day, and is estimated to cost $100,000. H. P. Marr, Kennett Square, Kennett, Pa., is treasurer.

The Foreign Trade Bureau of the Philadelphia Commercial Museum, Thirty-fourth Street, has received an inquiry from a company at Cuzco, which desires to get in touch with American manufacturers of agricultural machinery, sawmill machinery and other mechanical equipment.

Harry Sley, Philadelphia, operating the New Camac Garage, has taken title to the eight-story building, 89 x 150 ft. at 329-35 South Broad Street for the establishment of an automobile service, repair and parts plant.

Ovens, power, and other mechanical equipment will be installed in the five-story plant to be erected at Hunting Park Avenue and Twenty-eighth Street, Philadelphia, by the Tasty Baking Co., 2335 Sedgley Street, estimated to cost $100,000, for which a general contract has just been let to the John N. Gill Construction Co., Otis Building.

A manual training department will be installed in the two-story senior and junior high school to be erected at

Duncannon, Pa., for which plans are being drawn by Lawrie, Green & Co., 222 Market Street, Harrisburg, Pa., architects.

The Penn Central Light & Power Co., Altoona, Pa., has acquired the plant and property of the Ebensburg Light & Power Co., Ebensburg, Pa., for $200,000. Extensions and improvements will be made in the power house and system.

The Pierce, Butler & Pierce Mfg. Co., Syracuse, N. Y., manufacturer of radiators and other steam-heating equipment, is planning to increase the capacity of its branch plant at Huntingdon, Pa., about 50 per cent.

S. Mellner, 233 North Eighth Street, Allentown, Pa., is planning for the installation of a mechanical coal-loading and handling plant on Lehigh Street, to cost about $20,000.

The Reading Hardware Co., Reading, Pa., is taking bids on a general contract for a new one-story foundry and machine shop. The Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect.

The Metropolitan Edison Co., Reading, Pa., will construct an addition to its steam-operated electric power plant at West Reading, to increase the capacity from 33,000 kw. to 70,000 kw. New hydroelectric power equipment will be installed at the plant of the York Haven Water & Power Co., York Haven, Pa., recently purchased. Additional transmission lines will be built.

A manual training department will be installed in the proposed two-story and basement high school to be erected at Ashland, Pa., estimated to cost $100,000. Hersh & Schaller, Altoona, Pa., are architects.

Gannett, Seeley & Fleming, Inc., engineer, 204 Locust Street, Harrisburg, Pa., is organizing the Northern Power Co., with capital of $500,000, to take over and merge 17 electric light and power companies operating in the vicinity of Blossburg, Pa., including the Blossburg Electric Light & Power Co., and for which plans are being drawn for a new power plant to cost approximately $150,000.

The Penn Central Electric Co., Altoona, Pa., has organized the Central Transmission Co., to operate as a subsidiary organization, for the consolidation of 11 light and power companies operating in this vicinity. The parent organzation has commenced the erection of a new electric generating plant at Saxton, Pa.

The Trenton Potteries Co., North Clinton and Ott Streets, Trenton, N. J., manufacturer of sanitary ware, has awarded contract to S. W. Mather & Sons, Greenwood Avenue, for a four-story addition, 72 x 115 ft., on Lalor Street, to cost $100,000.

The Berks Foundry & Mfg. Co., Hamburg, Berks Post Office, Pa., which operates jobbing foundries at Hamburg, Pa., and Watsontown, Pa., has completed improvements to both of its plants. At Watsontown there has been an addition to the shipping floor which will enable the company to make carload shipments direct from the foundry. Ample provision has been made for storage in this addition. At Hamburg a fire-proof building, 60 x 140 ft., has been finished and is being equipped with machinery. This will not only enable the company to finish its own castings, but the addition of a wooden and metal pattern department will enable it to make all its own patterns. During the past year an addition was built to the foundry and a sand blast machine installed.

Pittsburgh

PITTSBURGH, Jan. 15.

ACTIVITY still is greater in cranes and heavy equipment than in machine tools. There seems to be no lack of inquiry for tools but actual business still is light. On the other hand, a number of crane orders have been entered and the pending list has been increased by new inquiries.

The Meyers Machine Tool Co., Columbia, Pa., has advanced lathe prices 10 per cent, effective Jan. 1. The Dalton Mfg. Corporation, Sound Beach, Conn., has reduced prices of bench lathes fully 10 per cent.

The Blackwood Steel Corporation, Parkersburg, W. Va., has closed for a 7½-ton, 3-motor, 58-ft. 4-in. span crane with the Milwaukee Electric Crane & Mfg. Co., and the same company also has closed for one 5-ton, 3-motor, 39-ft. 6-in. span crane, with magnet cable drum for the National Radiator Co. for its Johnstown, Pa., plant and two 3-ton, 3-motor, 26-ft. 9-in. span cranes for the Newcastle, Pa., works of that company. The Wheeling Steel Corporation has placed an order for a 10-ton Shaw crane for its Steubenville, Ohio, works and the Cutler Steel Co., New Cumberland, W. Va., has closed for a 10-ton Pawling & Harnischfeger crane. Three or four cranes in addition to those placed recently by the American Rolling Mill Co., Middletown, Ohio, for its Ashland, Ky., plant have been placed since last week with the Morgan Engineering Co., which also took the other cranes. The Pennsylvania Railroad inquiry for cranes and tools for its Conway shops, Freedom, Pa., remains on the prospective list, but the purchasing department is believed to have decided upon what will be bought and the purchase is held up pending the granting of the appropriation.

The Pennsylvania Lubricating Co., Thirty-fourth Street and the Allegheny Valley Railroad, Pittsburgh, has acquired property at Thirty-eighth and Smallman Streets, 92 x 120 ft., 90 x 120 ft., and 24 x 120 ft., for plant extensions.

The Seyler Mfg. Co., Pittsburgh, manufacturer of hardware specialties, has commenced the erection of an addition, totaling about 15,000 sq. ft. of floor area, for the manufacture of brackets and kindred products.

The Bernard Gloekler Co., 1127 Penn Avenue, Pittsburgh, manufacturer of refrigerating machinery, show cases, etc., has awarded contract to Joseph D. Fuhr, Pittsburgh, for a new one-story plant on East Twelfth Street, Erie, Pa., to cost $55,000.

C. B. Collins, Franklin, Pa., head of the Collins Safety Razor Co., is planning the establishment of new works to manufacture special flashlights, flashlight holders, etc.

The Hammond Bag & Paper Co., P. O., Box 467, Wellsburg, W. Va., is planning for the installation of transmission equipment and other apparatus, including shafting, pulleys, belting, rotary steamers, etc.

The Marion Construction Co., Fairview, W. Va., has tentative plans for rebuilding its planing mill recently destroyed by fire with loss of $60,000, including machinery. T. R. Montgomery heads the company.

The United States Engineer Office, Huntington, W. Va., will receive bids until Jan. 22 for button-head rivets, steel cotter pins, structural bar steel and machine steel, as set forth in Circular 51.

The Standard Wire Co., 706 West Grant Street, Newcastle, Pa., has acquired the plant and equipment of the Buckeye Register Co., Warren, Ohio, and will remove the works to New Castle. A new building will be erected. It is proposed to continue certain products of Buckeye manufacture. Jonas Kaufman is president.

The Penn Public Service Corporation, Johnstown, Pa., has completed negotiations for the purchase of the plants and properties of the Warren, DuBois and Jefferson Electric Light & Power companies, and will merge the interests. Extensions and improvements will be made in power plants and system, including the erection of a hydroelectric power station on the Youghiogheny River. Frederick Hepburn is president.

The Edna Gas Coal Co., Brady, Monongalia County, W. Va., recently organized with a capital of $1,500,000, has acquired the local No. 11 mines of the Jamison Coal & Coke Co., Greensburg, Pa., totaling more than 1000 acres. Additional electric power and other mining machinery will be installed.

The Sterling Coal Co., Bakerton, Pa., will make extensions and improvements at its property to cost approximately $250,000, including the installation of additional machinery. An all-steel tipple will be constructed, with rock dump, picking table and screens; a new mechanical fan system will be installed and a one-story machine shop and one-story forge shop erected.

The Board of City Commissioners, Johnstown, Pa., will take bids in February for machine tools, bench tools and other equipment for installation in the new municipal machine shop at Market and Stoneycreek Streets.

Buffalo

BUFFALO, Jan. 15.

PLANS are being prepared for a one-story power house, 25 x 75 ft., at the plant of the Jamestown Chair Co., Windsor Street, Jamestown, N. Y. William Brooks is company engineer.

The Pratt & Letchworth Co., 189 Tonawanda Street, Buffalo, manufacturer of iron and steel castings, etc., is planning the construction of a new one-story foundry. A list of equipment will soon be arranged.

The Binghamton Light, Heat & Power Co., Washington Street, Binghamton, N. Y., has plans for enlargements in its power house at Johnson City, including the installation of new electric and steam power equipment, estimated to cost $800,000. Extensions will be made in the transmission system, including sub-station equipment, to cost $200,000.

Electrically-operated pumping machinery will be installed at the proposed joint waterworks plant to be built at Chenango Bridge, N. Y., by the Town Councils of Chenango and Fenton, N. Y., estimated to cost $100,000. The Board of

Supervisors of Broome County, Binghamton, is interested in the project.

The J. E. Smith & Sons Co., 50 Broadway, Buffalo, manufacturer of butchers' machinery, is planning the erection of a new one-story factory on Blossom Alley, 55 x 150 ft.

The J. B. Lang Engine & Garage Co., 125 East Green Street, Ithaca, N. Y., will take bids at once for a one-story service and repair works addition at Green and Tioga Streets, 60 x 100 ft., to cost approximately $32,000. Gibb & Waltz, 110 North Tioga Street, are architects.

The Hall Coal Co., Ogdensburg, N. Y., is planning for the installation of an electric traveling crane to replace one destroyed some time ago by storm.

The International Railway Co., Ellicott Square, Buffalo, N. Y., is perfecting plans for rebuilding its car shops and barns at Cold Springs, recently destroyed by fire. The new structures are estimated to cost $250,000, with equipment.

The Jamestown Iron Works, Sherman Place, Jamestown, N. Y., has plans in progress for rebuilding the portion of its machine shop and foundry recently destroyed by fire.

A manual training department will be installed in the proposed two-story and basement high school to be erected on Woods Road, Solvay, N. Y., estimated to cost $400,000. M. L. King, Snow Building, Syracuse, is architect.

The Cataract City Milling Co., Canal Basin, Niagara Falls, N. Y., is planning to rebuild its wheel house and other power departments in the lower Niagara River, recently destroyed by fire, with loss estimated at $45,000.

The Board of Supervisors, Onondaga County, Syracuse, N. Y., is planning to purchase a revolving crane, with clamshell bucket, about ¾-yd. capacity. F. X. Wood, Court House, is purchasing agent.

The Jamestown Metal Desk Co., Blackstone Avenue, Jamestown, N. Y., has awarded contract to P. A. Peterson, 108 Charles Street, for a one-story addition, 100 x 200 ft., to cost $50,000. Beck & Tinkham, 319 Washington Street, are architects.

Manual training departments will be installed in the two new junior high schools to be erected on Front Street and on Buffalo Street, Jamestown, N. Y., for which bids will be received on Feb. 9 and Feb. 23. Johnson & Ford, Fenton Building, are architects.

Equipment for a vocational school will be installed in the Buffalo Orphan Asylum building, Elmwood Avenue, which has been taken over as a school site by the city.

The Dunlop Tire & Rubber Co., River Road, Buffalo, will begin operations March 1. Some tire-making machinery is at the plant, but more will be purchased as production increases.

The Seneca Iron & Steel Co., sheet maker, Blasdell, N. Y., has purchased six acres adjoining its plant and will erect an addition.

C. R. Keys, vice-president Curtis Aero-plane Motor Corporation, Buffalo, states that the company has received an order from the United States Government for 2000 airplane engines to cost $3,000,000. They will be built at the Churchill Street plant of the Curtis company.

An addition to station No. 3 in the steam generating and heating plant of the Rochester Gas & Electric Corporation, Rochester, N. Y., will be built to house the switching apparatus and a new electric boiler. This apparatus involves an unusual idea in boiler construction, according to the general manager, Herman Russel. Approximately $400,000 will be expended on the extension, about three-fourths of which will be required for equipment. During those periods when the entire current generated from the Genesee River is not required in city service lines, the boiler will be operated to furnish steam for the station. Three electrodes made of iron piping comprise the heating unit in the boiler, which will consume about 3000 kw. Use of the apparatus will not be economical at all times, but considerable saving in coal will be effected when the water is high.

Detroit

DETROIT, Jan. 15.

DODGE BROTHERS, INC., 7900 Joseph Campau Avenue, Hamtramck, Detroit, has plans in preparation for two additions, comprising a four-story and basement building, 100 x 450 ft., and one-story structure, 85 x 100 ft. The first noted will be used as a parts department, and the other for general operating service. Smith, Hinchman & Grylls, 800 Marquette Building, are architects.

Fire, Jan. 8, destroyed a portion of the plant of the Wilson Foundry & Machine Co., Pontiac, Mich., and partially damaged the adjoining works of the Michigan Drop Forge Co., with combined loss of about $75,000. Both plants have resumed operations and plan for immediate rebuilding.

The Grand Rapids Die & Tool Co., Grand Rapids, Mich., has removed its plant from 1354 Alpine Avenue to a building at 113 Michigan Street, N.W., where about four times the previous floor space will be provided. The equipment installation will be increased. A. J. Kortz is manager.

A power house will be built at the new State prison to be erected at North Forum, Mich., by the Michigan State Prison Board, Jackson, estimated to cost $3,000,000. Smith, Hinchman & Grylls, 800 Marquette Building, Detroit, are architects.

The Cadillac Motor Car Co., 2860 Clark Street, Detroit, has commenced the erection of a one-story building, to cost about $30,000, exclusive of equipment.

The Detroit Edison Co., 200 Second Avenue, Detroit, is planning the erection of a new two-story power house at Milan, Mich., to cost $40,000. It is disposing of a new bond issue of $1,500,000, a portion of the proceeds to be used for extensions and improvements. A. S. Douglas is chief engineer.

The Liberty Starter Co., 2281 West Fort Street, Detroit, manufacturer of starting and lighting equipment, is said to be planning the erection of a new factory. It recently increased its capital to $1,000,000 for expansion.

The Marine Rubber Corporation, Ludington, Mich., has been organized with a capital of $1,250,000 to take over and succeed the Ludington Rubber Co. Headquarters of the new organization will be at Sparta, Mich. Operations will be continued at the Ludington mill, and plans are in progress for extensions and improvements. A. H. Gruber is president.

Cleveland

CLEVELAND, Jan. 15.

CONSIDERABLE machine tool business continues to come from the automobile industry in the Detroit territory. Several car builders in addition to the Ford Motor Co. are figuring on additional equipment for expansions. The expectation that 1923 will exceed last year in the demand for motor cars will probably result in a good volume of business from this industry in the next two or three months. The Ford company placed some additional equipment during the week, including several lathes, and is inquiring for about a dozen automatic machines. Other inquiries from Detroit automobile builders total 25 or 30 automatics which will probably be placed shortly. Orders for automatic machines have improved materially, several being closed for single machines and for lots up to four.

Local machine tool dealers did a moderate volume of business during the week, mostly in single machines, and dealers report considerable business in prospect. The Harris Automatic Press Co., Cleveland, purchased a 36-in. x 18-ft. lathe.

The only price change reported is an advance by the Garvin Machine Co., New York, which has marked up prices on all lines by withdrawing 12½ per cent discount and now quoting list prices.

The Weldless Rolled Ring Co., Cleveland, has been organized and will establish a plant at 10022 Detroit Avenue for the manufacture of ring gear blanks and bearing ring blanks used in the automotive industry. Rings will also be made for the textile industry. Equipment is now being installed and it is expected that the plant will be in operation about Feb. 1. The company was formed by former executives of the Washington Steel & Ordnance Co., Washington, D. C. Samuel V. Hunnings, former metallurgical superintendent of the Washington company, is president, Charles R. Marsh of New York secretary-treasurer, and C. C. Venable chief engineer. These officers, with C. R. Cross and A. L. Alexander, constitute the board of directors.

The Clyde Cutlery Co., Clyde, Ohio, is erecting a new factory building 55 x 85 ft. to replace one recently burned.

The Defiance Screw Machine Products Co., Defiance, Ohio, has increased its capital stock from $25,000 to $600,000 to take care of recent expansion and provide for future extensions.

The Universal Smokeless Boiler Co., Akron, Ohio, has purchased the factory in Ravenna, Ohio, formerly owned by the United Roll & Foundry Co., and plans to place it in operation shortly. George Franzheim is president of the company.

The James H. Bean Foundry Co., Martins Ferry, Ohio, has been incorporated by J. H. Bean, William King and others, with a capital stock of $100,000. Plant extensions are reported to be under consideration.

Chicago

CHICAGO, Jan. 15.

DEMAND for machine tools has not yet gathered the momentum which was expected, but buying is undeniably better than in December. The Chicago, Milwaukee & St. Paul has purchased a number of re-manufactured machines, including two 36-in. x 18-ft. engine lathes, two turret lathes, a 26-in. shaper, a 25-in. x 10-ft., a 24-in. x 10-ft. and an 18-in. x 10-ft. lathe. It is about to close for a slab miller and a boring mill, which will probably be bought new. The Rock Island Lines are asking for prices on a motor-driven 48-in. car wheel boring machine, and a motor-driven 16-in. x 36-in. between centers portable engine lathe, and a considerable number of additional inquiries from that system are looked for. The Atchison, Topeka & Santa Fe is in the market for a No. 1 emery grinding machine.

Demand from miscellaneous users shows some improvement. The Continental Can Co., Chicago, has closed for two 16-in. engine lathes, a 24-in. engine lathe, and a 4-ft. radial drill. Incidentally, the canning industry anticipates an unusually active year. The Otis Elevator Co., Chicago, has ordered a 24-in. engine lathe and a 4-ft. radial drill, while the William Glader Machine Works, Chicago, has closed for an 18-in. and a 20-in. lathe.

Rather general price advances on standard types of tools are expected to be announced by the end of the month. Already at least four makes of planers have gone up from 5 to 15 per cent.

The crane market is more active. The Union Pacific has asked for figures for estimating purposes on a 200-ton and a 20-ton electric traveling crane for its proposed Los Angeles, Cal., shop. A considerable number of cranes and other material-handling equipment will be bought for the addition of the Pettibone-Mulliken Co., Chicago, and the Pressed Steel Mfg. Co. factory to be built at East Chicago, Ind. The Whiting Corporation, Harvey, Ill., recently booked the following orders for cranes and foundry equipment: A 5-ton electric traveling crane for Fairbanks, Morse & Co., Beloit, Wis.; a 200-ton locomotive hoist for the Missouri Pacific Railroad, St. Louis; a 200-ton locomotive hoist with 10 special trucks for the Boston & Maine Railway at Boston; a 72-in. cupola, a 60-in. cupola, three 42-in. cupolas, 24 charging cars, 18 coke cars for the Bartlett-Hayward Co., Baltimore; three 72-in. cupolas, one 60-in. cupola, and a complete powdered coal installation for six malleable furnaces for the American Radiator Co., Buffalo; 20 30 x 48 in. tumblers, and 10 42 x 72-in. tumblers for the Ford Motor Co., Detroit; a 250-ton locomotive handling crane and a 15-ton electric traveling crane for the Kansas City Southern.

M. H. Harris, 118 North La Salle Street, Chicago, is preparing plans for a two-story garage, repair and welding shop, 100 x 125 ft., to be erected on Fullerton Avenue, between Crawford and Harding Avenues, for the H. H. Riis Motor Co.

Plans have been prepared for a three-story 100-ft. extension to the first unit of a plant now being erected by E. J. Brach & Sons, confectioners, at Cicero and Austin Avenues. The plant unit as extended will be 100 x 400 ft.

The Stationers Engraving Co., 319 North Albany Avenue, Chicago, has let contract for a two-story factory, 90 x 150 ft., at 3115-23 Carroll Avenue, to cost $65,000.

The Ford Motor Co., Detroit, has purchased 167 acres on the Mississippi River at St. Paul, Minn., immediately adjacent to the Government high dam. Application has been made for power rights at the dam, but if this is denied it will erect a plant to be operated entirely by steam power. If water-power rights are granted, it has planned to build a $10,000,000 manufacturing plant.

Fairbanks, Morse & Co., Chicago, contemplates expanding its manufacturing facilities at Indianapolis, Ind., provided the site of the former Marion County Work House, Twenty-first Street and Northwestern Avenue, in that city, can be purchased. The present Indianapolis plant is across the street from this property, and is devoted to the manufacture of electric motors and generators. It covers about four and one-half acres, but there is no possibility of growth in any direction unless the County property can be obtained.

The City Council, Shelbyville, Ill., will open bids Feb. 5 on a new electric light plant, including power house, machinery, appliances, materials, tools, etc. To secure a definite cost for each part of the project, the work has been divided into 14 sections. Bids will be accepted for each section or for the entire work.

The General Electric Co. is constructing a boiler room addition, 20 x 30 ft., at its Decatur, Ind., plant. The addition will house a boiler.

The Northern Indiana Power Co., which recently purchased the plant and franchise of the Logansport Utilities Co., Logansport, Ind., has commenced the construction of a power plant to cost $500,000. New equipment will include three 565-hp. boilers, two 1000-kw. turbines, a large steel suspension tower, a pump house and filter plant.

The Northern States Power Co., St. Paul, Minn., has started the construction of a power plant on a 50-acre tract at High Bridge on the north side of the Mississippi River. This marks the beginning of a 10-year development program to involve an eventual expenditure of $80,000,000. From $8,000,000 to $10,000,000 will be spent this year.

The United States Shingle Co. has leased the former Motox Tractor Co. plant at Wabash, Ind., and will immediately install machinery for the manufacture of composition roofing. This company is a new organization, of which E. J. Cady, Chicago, is president. R. J. Evans, Wabash, is vice-president, and E. W. Criswell, formerly of Franklin, Pa., is secretary and treasurer.

The American Radiator Co., Buffalo, has let a contract for the construction of a one and two-story plant, 65 x 200 x 1000 ft., at Minnehaha and Fairview Avenues, St. Paul, Minn.

The Chicago & Eastern Illinois is preparing plans for a shop and roundhouse at Evansville, Ind, to cost $3,000,000.

The Evansville Structural Supply Co., Evansville, Ind., plans to construct a fabricating plant, 80 x 100 ft., to cost $27,000.

The Dickie Machine Works, Chicago, has leased space in the building at 429 West Superior Street, 50 x 100 ft., for a new plant.

The Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, has completed plans for the first unit of its new power plant at Waukegan, Ill., to cost $3,000,000. H. V. Von Holst is company engineer.

A vocational department will be installed in the new two-story and basement high school to be erected at Ida Grove, Iowa, estimated to cost $175,000. Keffer & Jones, 204 Masonic Building, are architects.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, is preparing plans for a one-story electric generating plant at Crawford Avenue and Thirty-fifth Street, with capacity of 320,000 kw., estimated to cost $5,000,000. Graham, Anderson, Probst & White, 80 East Jackson Boulevard, are architects.

George Williams, Denver, Colo., has plans for a six-story automobile service and repair building estimated to cost $100,000. Thomas F. Walsh, Denver, is architect.

A. I. Mathies, 601 South Eleventh Street, Springfield, Ill., will commence the erection of a one and two-story ice-manufacturing plant, 60 x 100 ft., on Edwards Street, estimated to cost $75,000. The Pillsbury Becker Co., St. Louis, is architect and engineer.

The Hopper Paper Co., Taylorville, Ill., recently organized, has rejected bids for its proposed mill, and will have revised plans drawn at once. It will be two stories, 80 x 160 ft., and is estimated to cost $80,000. B. Hopper, head of the Kalamazoo Sanitary Mfg. Co., Kalamazoo, Mich., is president of the Company. Billingham & Cobb, Press Building, Kalamazoo, are architects and engineers.

The Union Electric Light and Power Co., Twelfth and Locust Streets, St. Louis, will commence the erection of the first unit of a new generating plant at Cahokia, Ill., 345 x 800 ft., with capacity of 80,000 hp. It is estimated to cost $7,000,000, with machinery.

Indiana

INDIANAPOLIS, Jan. 15.

A MANUAL training department will be installed in the two-story and basement high school to be erected at Nineteenth Street and Grand Avenue, Connersville, Ind., estimated to cost $250,000, for which bids on a general contract will be called this month. E. E. Dunlap & Co., 909 State Life Building, are architects.

The Kitselman Brothers Co., Muncie, Ind., manufacturer of wire fencing, etc., and operating a subsidiary, the Indiana Wire & Steel Co., has acquired the former plant of the Pioneer Pole & Shaft Co., in the vicinity of its works, for $25,000, exclusive of equipment. It is planned to use the property for extensions in the wire goods plants.

The Common Council, Crawfordsville, Ind., will commence the immediate erection of an addition to the municipal power plant, including a 200-ft. radial brick stack, estimated to cost $50,000.

The Rice Box & Basket Co., English, Ind., will immediately rebuild its plant, recently destroyed by fire with loss esti-

...ed at $100,000, including equipment. The new structure, ... machinery, will cost approximately a like amount. ... J. Rice is president, and W. E. Rice, general manager.

The Evansville Structural Supply Co., 215 First Avenue, ...ville, Ind., has plans for a one-story steel fabricating ...dition, 80 x 100 ft., estimated to cost $30,000.

The Stanworth Tool Mfg. Co., Indianapolis, recently or...ized with a capital of $50,000, will establish a plant at ... West North Street, for the manufacture of a complete ... of boring tools. Arthur Stanworth is president and gen... manager, and Berne Nadall, vice-president and treasurer.

The Studebaker Corporation, South Bend., Ind., is ar...ging a construction program during 1923, involving about ...,000,000 of a fund of $15,000,000 established for this pur...ses. It is proposed to construct a number of new buildings ... an increase in practically every department, to allow a ...duction of 150,000 complete automobiles during the year, ...s compared with a gross output of 110,000 machines in 1922. ... is expected to have the expansion completed by Jan. 1, ...24, with the employment of 5000 additional men.

The J. K. Dering Coal Co., 332 South Michigan Avenue, Chicago, has plans for a new mechanical coal washery and sorting plant at Clinton, Ind., to be one story, 50 x 125 ft., estimated to cost $50,000, with machinery. The Allen & Garvin Co., 21 East Van Buren Street, Chicago, is engineer.

The Terre Haute, Indianapolis & Eastern Traction Co., Traction Terminal Building, Indianapolis, has been granted permission to build an addition to its steam-operated electric power plant on West Tenth Street, including new transmission and distributing lines, to cost in excess of $5,000,000, with equipment. Robert I. Todd is president.

Milwaukee

MILWAUKEE, Jan. 15.

COMPLETION of inventories has been followed by the putting out of inquiries for miscellaneous lists of machine tools which form a fairly large aggregate of potential business. Machine shops and manufacturing plants which have been passing through the holiday and inventory period without letting down operations to a minimum have kept the trade fairly active when ordinarily demand is very dull. Milling machine manufacturers are as busy, if not busier, than they were on a broad average throughout 1922. Automotive and railroad demands predominate.

The Federal Bridge & Structural Co., Waukesha, Wis., originally the Modern Steel Structural Co., which for the past two years has devoted its facilities principally to the production of metal sash, has now withdrawn from the fabricating field. As previously noted, the Federal Steel Sash Co. has recently been incorporated in Wisconsin with $50,000 capital to take over the business. Shape fabricating equipment generally has been sold or leased, and replaced with sash production machinery. The Northwestern Expanded Metal Co. of Chicago has been appointed selling agency. A part of the Federal works, has been sold to the Waukesha Steel Products Co., manufacturing steel fencing and heretofore operating in leased quarters. Henry Bryant is president and general manager of this company. The ownership and management of the Federal Steel Sash Co. is virtually identical with that of the Federal Bridge & Structural Co. C. J. McIntosh is president.

The Lakeshore Motors Co., Sturgeon Bay, Wis., contemplates the erection of a two-story brick and concrete addition, 50 ft. sq., to provide more machine shop space. Work will begin about April 1. Rudolph Herbold is secretary and treasurer.

The Hammer-Blow Tool Co. of Wausau, Wis., has been incorporated with a capital stock of $100,000 to manufacture power hammers and tool room and production specialties for metal-working plants. It has purchased the plant, equipment and business of the Danielson Tool Co., Wausau, established four years ago, and will continue the manufacture of its line of automotive shop tools. Thomas H. Jacob and Patrick T. Stone are the principals in the new organization.

The Wisconsin Metal Mfg. Co., operating factories in Prairie Farm, Wis., and Chicago, has decided to consolidate its works at Chippewa Falls, Wis., where an existing building has been purchased and is being altered and re-equipped until a new plant can be erected. The concern manufactures steel, copper and tin sheet metal goods, blower systems, air moistening devices and other sheet metal specialties. It is owned by Louis, Hokon, Harold, Albert and Julius Hoyoss.

The Advance Car Mover Co., Appleton, Wis., manufacturer of patented tools for moving freight cars on switch-tracks, has increased its capital stock from $50,000 to $75,000 to finance increased production. Richard Miller is president and general manager.

The Common Council of Madison, Wis., has decided to proceed with the construction and equipment of a new sewage disposal plant estimated to cost $841,000, work to start about April 1. It will be of the Imhoff tank system type, with sprinkling filters, and have a daily capacity of 5,000,000 gal. Detailed specifications will be prepared at once under the direction of E. E. Parker, city engineer.

The Johnson Mfg. Co., Chippewa Falls, Wis., has been organized by G. W. Johnson, to engage in the machine shop business and specialize in automobile engine cylinder grinding. The concern has taken over half of the machine shop of the Northlite Mfg. Co., which has retired from the pump manufacturing business and leased its foundry to the Mattson Foundry Co. Mr. Johnson was one of the principal stockholders in the Northlite company.

The Northwestern Malleable Iron Co., 750 Park Street, Milwaukee, has engaged Hool, Johnson & Whitney, consulting engineers, to rebuild parts of its old plant, reconstruct timber roofs with steel, and otherwise modernize the works, at an estimated cost of $50,000.

The Chicago Extruded Metals Co. has been incorporated with a capital stock of $500,000 by James R. Anderson and associates who recently resigned connections with the Kenosha, Wis., works of the American Brass Co. The new concern will establish a plant at Cicero, Ill., and manufacture brass rods, tubes and similar products by the extruding process. Claude L. Huck, Chicago, and John Henley, Sam Anderson, George Rahr and Arthur Haas, of Kenosha, Wis., are associated in the enterprise.

The Nehls Boat and Furnace Works, Portage, Wis., has been organized by William Nehls, for many years building boats and hulls in the same city. It will build a two-story shop, 41 x 100 ft., one floor of which will be equipped for fabricating and assembling heating systems. The other floors will be used for making rowboats, canoes, etc. The total investment will be about $35,000.

The Racine, Wis., Common Council has taken action in favor of the establishment of a municipal machine and service shop, to be installed either in an existing building or in a new building. An investment not to exceed $20,000 initially is planned. Charles Ryba is city clerk.

The John S. Gregory Ice & Coal Co., 159 Ridge Street, Kenosha, Wis., contemplates the erection and equipment of an artificial ice producer plant and storage and distributing warehouse at a cost of about $90,000. Work probably will not begin until May 1.

Cincinnati

CINCINNATI, Jan. 15.

WHILE not exactly booming, the machine tool market is showing considerable life and the number of orders placed last week was very satisfactory. Heavy tools continue in demand and the larger planers and boring mills are being sought to the almost total exclusion of the smaller sizes. In engine lathes the same condition prevails, but in a more limited extent.

While there have been no outstanding purchases, the number of orders running up to three and four machines was much greater than for any similar period within the past few months, the business coming from widely scattered points. The Louisville & Nashville Railroad closed on its list, buying four engine lathes, one planer and one boring mill. Action is expected on the Big Four list this week.

Planer manufacturers in this district have advanced prices from 5 to 15 per cent on different sizes, and some engine lathe manufacturers are expected to make announcements of advances, effective Feb. 1.

The Oldroyd Machine Co., Cincinnati, has been incorporated with a capitalization of $10,000 to manufacture coal mining and coal loading machines and is a reorganization of the former company of the same name. It is planned to secure a factory to build the machines, which are now being made by contract. C. S. Oldroyd is president. Offices are at 208 Masonic Temple, Cincinnati.

Fire Jan. 2 caused $20,000 damage to the machinery and plant of the Buckeye Steel Castings Co., Columbus, Ohio. The fire was caused by a short circuit in a generator in the power house. Operations were not interfered with.

The United States Can Co., Cincinnati, has awarded contract for a reinforced concrete addition to its plant at Norwood, three stories, 80 x 120 ft. With equipment, it will cost approximately $100,000.

The Central South

ST. LOUIS, Jan. 15.

THE Fuller Mfg. Co., Kansas City, Mo., is arranging for the establishment of a branch plant at 5200 North Second Street, St. Louis, for the manufacture of automobile equipment. S. H. Darcy will be in charge.

A manual training department will be installed in the new two-story high school to be erected at Mendon, Mo., for which bids on a general contract are being asked until Jan. 23. W. E. Hulse & Co., Hutchinson, Kan., are architects.

The Tennessee Electric Power Co., Chattanooga, Tenn., is arranging an appropriation of $2,450,000 for extensions and improvements in power plants and system during 1923. A steel tower transmission line will be constructed to Lindale. B. C. Edgar is vice-president.

The St. Louis-San Francisco Railroad Co., St. Louis, has awarded contract to C. E. Hamilton, St. Louis, for a new engine house with repair facilities at Muskogee, Okla. F. G. Jonah is chief engineer.

The Empire District Electric Co., Joplin, Mo., is completing plans for the initial unit of its new hydroelectric power plant in the vicinity of Branson, Mo., to cost in excess of $2,500,000. The ultimate generating station will cost $10,000,000.

A power house will be constructed by the Brown Shoe Co., 1700 Washington Avenue, St. Louis, in connection with its proposed three-story plant at Union City, Tenn., to cost about $200,000. T. J. Nahahan, Boatmans Bank Building, St. Louis, is architect.

The Lion Oil & Refining Co., Kansas City, Mo., will build a new refinery and storage plant at Pearson, Ark.

The Missouri-Pacific Railroad Co., St. Louis, will commence the erection of an addition to its local machine shop. Extensions and improvements will also be made at the locomotive repair shops at Poplar Bluff, Mo., to cost about $17,000.

A manual training department will be installed in the new two-story and basement high school to be erected at Lees Summit, Mo., estimated to cost $100,000, for which bids will be asked on a general contract this month. William H. Sayler & Co., 306 Mutual Building, Kansas City, Mo., are architects.

The Common Council, Pauls Valley, Okla., has received authority to issue bonds for $53,000 for the installation of a municipal electric power plant. Electrically-operated pumping machinery will also be installed at the waterworks. V. V. Long & Co., 1300 Colcord Building, Oklahoma City, Okla., are architects.

The Sinclair Crude Purchasing Co., Tulsa, Okla., a subsidiary of the Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, will build 18 automatic pumping plants in connection with a new 720-mile steel pipe line to the Salt Creek oil field, estimated to cost $600,000.

The New State Ice Co., Oklahoma City, Okla., is taking bids on a general contract for a new ice-manufacturing plant estimated to cost $275,000, with machinery. Carl S. Glitsch is vice-president. Ophuls & Hill, 112 West Forty-second Street, New York, are engineers.

The Blue Valley Ice & Storage Co., Leeds, Mo., has plans for the construction of a cold storage, refrigerating and caricing plant on the line of the Missouri-Kansas-Texas Railway, 78 x 80 ft., to cost $50,000. Hans Von Unwerth, 509 Finance Building, Kansas City, Mo., is engineer.

The Summers-Hermann Co., 906 South Third Street, Louisville, is planning the erection of a new automobile service and repair plant at Third and Breckenridge Streets, estimated to cost $120,000, including equipment.

A vocational department will be installed in the new high school to be erected at Bristol, Tenn., estimated to cost $150,000. D. A. Beeson, Johnson City, Tenn., is architect.

The North American Oil Co., El Dorado, Ark., is perfecting plans for rebuilding the portion of its oil refinery recently destroyed by fire with loss estimated at $200,000, including machinery.

The Appalachian Flooring Co., Knoxville, Tenn., recently organized with a capital of $150,000, is planning for the installation of a new factory in the vicinity of the works of the Maples Lumber Co., Gillespie Avenue, with which it is affiliated. All machinery will be electrically operated. Carl F. Maples and Morris Bradt head the company.

A manual training department will be installed in the new four-story and basement junior high school to be erected at Winfield, Kan., estimated to cost $200,000. J. M. Fuller, Cowley Building, is architect.

Arthur L. Mullergren, 555 Gates Building, Kansas City, Mo., consulting engineer, is preparing plans for a new hydroelectric power plant in the vicinity of Osceola, Mo., estimated to cost $450,000. It will be owned and operated by a company now being formed under the direction of E. E. Peake, Kansas City.

The Chevrolet Motor Co., Detroit, has tentative plans for the establishment of a branch assembling plant at Memphis, Tenn.

Electric motors, controllers, conveying machinery and other equipment will be installed in the new seven-story printing plant, 60 x 125 ft., to be erected by the Von Hoffman Press, Ninth and Walnut Streets, St. Louis, estimated to cost $200,000.

The Arkansas Brick & Tile Co., Little Rock, Ark., is planning for the installation of additional power equipment. Inquiries are being made for boilers and other apparatus.

The Gulf States

BIRMINGHAM, Jan. 15.

THE Oak Cliff Paper Mills, Inc., Oak Cliff, Dallas, Tex., is planning for the immediate erection of an addition for the production of corrugated board, fiber board, etc., estimated to cost $150,000, of which amount the machinery will cost approximately one-half. E. T. Fleming is president.

The National Cast Iron Pipe Co., Tarrant City, Ala., has broken ground for a new one-story foundry, estimated to cost more than $200,000, including equipment.

The San Antonio Public Service Co., San Antonio, Tex., is arranging an appropriation of $1,000,000 for extensions and improvements in its power plants and system during 1923, to include the installation of considerable additional equipment. E. H. Kiler is vice-president and general manager.

The E. Nelson Mfg. Co., Waco, Tex., has tentative plans for rebuilding its wood-working plant and planing mill, destroyed by fire Jan. 4 with loss estimated at $100,000, including machinery.

The Bureau of Yards and Docks, Navy Department, Washington, has plans for the installation of a new ice and refrigerating plant at the veterans' hospital, Gulfport, Miss., and will call for bids under Specification 4780.

O. H. Ertzinger, Bay Minette, Ala., is organizing a company to establish and operate a plant to manufacture mechanical and other toys. A metal-working department will be installed.

The Board of Education, Temple, Tex., has preliminary plans for the establishment of a manual training department in the local high school. L. C. Proctor, city superintendent, is in charge.

The Madras Marble Co., Sylacauga, Ala., is completing plans for a new finishing mill, to be equipped with grinding, surfacing and polishing machinery, estimated to cost $55,000.

The Eastland-Pioneer Oil Refining Co., Cisco, Tex., has plans for the immediate enlargement of its refinery, recently acquired from the Liberty Refining Co. It is proposed to install machinery to develop a capacity of 6000 bbl. per day. Plans are also being considered for the installation of a cracking plant. The expansion will cost approximately $70,000. The company was organized recently with Edward Kippax as president, and Ernest Kester, secretary and treasurer. R. E. Whitlock is general manager.

The Board of Education, Port Arthur, Tex., is taking bids until Jan. 27 on a general contract for a two-story addition to the local high school, 145 x 160 ft., to include a vocational department with machine shops and other mechanical departments; a two-story power house will also be erected. At the same time, the board will take bids for a new two-story grade school on De Queen Boulevard, to include a manual training department. The structures will cost $400,000 and $150,000, in the order noted. W. B. Ittner, 911 Locust Street, St. Louis, is architect.

The Texas & Pacific Railroad Co., Dallas, Tex., has tentative plans under advisement for rebuilding the portion of its engine house and repair shops at Longview, Tex., destroyed by fire Dec. 30 with loss of $150,000.

The American Well & Prospecting Co., Corsicana, Tex., manufacturer of oil well machinery, etc., has preliminary plans for extensions and improvements in its works, including the installation of additional machinery, estimated to cost $100,000. J. E. Rittersbacher is president.

The Sun Oil Co., Miami Beach, Fla., is planning for the installation of a machine shop at its local storage and distributing plant.

The West Texas Utilities Co., Abilene, Tex., operating light and power utilities throughout this district, has been chartered under State laws, with a capital of $1,500,000, to provide for proposed expansion. Plans are being considered for extensions in the main power house and system. G. W. Fry is general manager.

A manual training department will be installed in the

proposed high school to be erected at Hull, Tex., by the Hull Independent School District, estimated to cost $100,000. Alfred C. Finn, Goggan Building, Houston, Tex., is architect.

The Common Council, Tulia, Tex., is disposing of a bond issue of $100,000, the proceeds to be used for a municipal electric plant and waterworks.

The Pacific Coast

SAN FRANCISCO, Jan. 9.

THE Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is planning the erection of a new machine shop, meter shop, transformer repair works and other buildings. A one-story automobile service and repair works for company trucks and cars will also be built.

The Savage Tire Co., San Diego, Cal., will install considerable additional equipment at its plant.

The Richmond Sanitary Mfg. Co., Richmond, Cal., manufacturer of sanitary ware, has awarded contract to Sommarstrom Brothers, 306 Fourteenth Street, Oakland, Cal., for a two-story addition estimated to cost $20,000, exclusive of equipment.

The National Ice Co., Postal Telegraph Building, San Francisco, will soon take bids for a two-story addition to its ice-manufacturing plant on Fourth Street, San Rafael, Cal., estimated to cost $100,000 with machinery. The company's engineering department is in charge.

The White Pine Sash Co., Myrtle Street, Spokane, Wash., is preparing plans for a new lumber plant, with power house, at Kettle Falls, Wash., estimated to cost $150,000.

The Bureau of Yards and Docks, Navy Department, Washington, has plans for the installation of electric traveling cranes at the Puget Sound Navy Yard, Seattle, Wash., and will soon call for bids under Specification 4755.

The Pacific Power & Light Co., Portland, Ore., is arranging an appropriation of $500,000 for extensions and improvements in its power plant and system in the vicinity of Pendleton, Ore.

The Hammond Lumber Co., Astoria, Ore., has plans for the erection of a new mill with capacity of 600,000 ft. per day, estimated to cost approximately $1,000,000. A power house and machine shop are also contemplated.

The Visalia Agricultural Works, Inc., Visalia, Cal., recently organized, has acquired land in the Pratt Villa section, near the Santa Fe Railroad, and plans the early erection of works for the manufacture of agricultural implements and equipment.

The Columbia River Paper Mills, Inc., Vancouver, Wash., a subsidiary of the California-Oregon Paper Mills Co., East Fifty-seventh Street, Los Angeles, is completing arrangements with the local council for the vacating of property to be used as a site for the erection of a new plant, to cost in excess of $200,000.

Frank E. Goetze, Brown and Fourth Streets, Napa, Cal., will commence the erection of a one-story addition to his machine shop, 45 x 65 ft.

The Union Pacific Railroad Co., Fifteenth and Dodge Streets, Omaha, Neb., will soon call for bids for the erection of its proposed locomotive and car repair shops at Los Angeles, estimated to cost close to $700,000 with machinery. R. L. Huntley, Omaha, is chief engineer.

Canada

TORONTO, Jan. 15.

BUSINESS in the machine tool market is again showing improvement and dealers report renewed interest by buyers in various parts of the Dominion. A large volume of prospective business is in sight which is expected to be closed before the end of this quarter. Municipalities have also announced their intention of making extensions and installing additional equipment in waterworks, sewage and electrical works during the year. Equipment for automobile plants is in greater demand and a brisk call is noted from wood-working factories. Small tools are active with prices showing an upward tendency.

Inquiries on export account are also coming in and a considerable increase in sales is looked for.

The Department of Trade and Commerce, Ottawa, file No. 26502, reports that the State Electricity Commission on Victoria, 22-32 William Street, Melbourne, Australia, is asking bids on the following equipment:

Three 25 kva. three-phase, 50-cycle oil insulated, self-cooled, transformers, 6600 volts delta to 415/240 volts star, complete with oil.

Six 50 kva. three-phase, 50-cycle oil insulated, self-cooled, transformers, 6600 volts delta to 415/240 volts star, complete with oil.

Six 100 kva. three-phase, 50-cycle oil insulated, self-cooled transformers, 6600 volts delta to 415/240 volts star complete with oil.

One complete set of the spare low and high tension coils and the necessary insulation required for one leg of one transformer of each rating. Three spare high-tension bushings complete and three spare low-tension bushings complete.

The time for receiving bids on drydock machinery for Esquimalt, B. C., has been extended until Feb. 15, R. C. Desrochers is secretary Department of Public Works, Ottawa.

The town of Kincardine, Ont., will install an auxiliary gasoline waterworks pump to cost $7,000. J. H. Scougall is clerk.

North Vancouver, B. C., will build an addition to the waterworks plant to cost $40,000. G. H. Morden is mayor.

The furniture factory owned by Emile Collins, St. Thomas, Ont., was destroyed by fire with loss to building and machinery of $40,000.

It is reported that the Back River Power Co., Riviere Des Prairies, Que., is having plans prepared for power development to cost $7,000,000.

Bids will be received by the chairman of the Toronto Transportation Commission, Toronto, until Jan. 18, for the erection of a general repair shop at the corner of Bathurst Street and Davenport Road, of brick and steel, comprising main structure boiler house, and subsidiary buildings. Equipment will be purchased later. H. H. Couzens is general manager of the commission.

F. I. Fox, manager Ford Motor Co., of Canada, Toronto, is receiving tenders for the erection of a plant on Danforth Avenue, Toronto, between Luttrell and Victoria Park Avenues, at a cost of approximately $1,500,000. The plant will cover an area of 15½ acres and is expected to be completed and in operation by next summer.

The Eureka Planter Co., Woodstock, Ont., will start work early in the spring on an addition to its foundry, in which a considerable amount of new equipment will be installed. H. C. Norry is vice-president.

The Town Council, Sandwich, Ont., is having plans prepared for a sewage disposal plant to cost $150,000. McColl & Patterson, Gas Building, Sandwich, are architects.

The Maloney Electric Co. of Canada, Ltd., Toronto, a subsidiary of the Maloney Electric Co., St. Louis, Mo., has been incorporated with a capital stock of $500,000 by George D. Y. Leacock, Richard W. Hart and others as provisional directors. It has purchased the tractor building of the Canadian Fairbanks Morse Co., on Sterling Road, at a cost of $100,000, which will be equipped for the manufacture of transformers, electrical equipment, etc.

Construction has been started on the foundation for the Belleview Pumping Station, Brantford, Ont., and bids for equipment will be received by F. Adams, engineer, March 1.

The C. T. White Co., Sussex, N. B., will build a lumber mill at Moncton, N. B., and is interested in prices on equipment.

The Canada Wire Fence Co., Whitby, Ont., will erect a plant to cost $25,000. Col. J. A. Currie, Warren Road, Toronto, is interested.

The Howard Furnace Co., Yonge Street, Toronto, has started work on a four-story assembling plant. It will have approximately 1500 ft. of floor space on each floor and will be equipped for sheet metal work. The plant will cost $25,000 and is expected to be in operation by April.

American Rolling Mill Co. Offering

The American Rolling Mill Co., Middletown, Ohio offered to public subscription 70,000 shares of cumulative 7 per cent preferred stock at $100 par value, through the Guaranty Trust Co. of New York as transfer agent. It was announced on Jan. 8 that the entire issue had been taken. The rest of the $30,000,000 authorized preferred stock may be issued at varying dividend rates and redemption prices. The purpose of the issue as stated by George M. Verity, president of the company, is to provide for the retirement of mortgage and other indebtedness assumed in connection with the purchase in December, 1921, of the Ashland, Ky., properties, and to provide funds for the construction of finishing mills on the acquired property. With the completion of these mills the company's annual finishing capacity will be increased from about 300,000 to 500,000 tons. In its November, 1922, balance sheet the company showed net tangible assets of $46,300,000, or $315 per share of preferred stock.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The following quotations are made by New York City warehouses.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipments in carload lots from mills, these prices are given for their convenience.

On a number of items the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	
Refined iron bars, base price	3.04c.
Swedish bars, base price	7.50c.
Soft steel bars, base price	3.04c.
Hoops, base price	4.39c.
Bands, base price	3.84c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.14c.
Channels, angles and tees under 3 in. x ¼ in., base	3.04c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.10c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.30c.
Toe-calk, ½ x ⅜ in. and larger	4.15c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.25c.
Open-hearth spring steel	4.00c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.90c.
Squares, flats and hex	4.40c.
Standard cast steel, base price	15.00c.
Extra cast steel	18.00c.
Special cast steel	23.00c.

Tank Plates—Steel

¼ in. and heavier	3.14c.

Sheets

Blue Annealed

	Per Lb.
No. 10	4.19c.
No. 12	4.24c.
No. 14	4.29c.
No. 16	4.39c.

Box Annealed—Black

	Soft Steel C. R., One Pass. Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	5.00c.
No. 26	4.40c.	5.05c.
No. 28	4.50c.	5.15c.
No. 30	4.75c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.35c. to 4.60c.
No. 16	4.50c. to 4.75c.
Nos. 18 and 20	4.65c. to 4.90c.
Nos. 22 and 24	4.80c. to 5.05c.
No. 26	4.95c. to 5.20c.
No. 27	5.10c. to 5.35c.
No. 28	5.25c. to 5.50c.
No. 30	5.75c. to 6.00c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—50	—35	½ in. Butt	—11	+13
¾ in. Butt	—55	—42	¾ in. Butt	—17	— 1
1-3 in. Butt	—57	—44	1-1½ in. Butt	—20	— 2
2½-6 in. Lap.	—54	—41	2 in. Lap	—14	+ 2
7-8 in. Lap	—50	—26	2½-6 in. Lap.	—18	— 2
9-12 in. Lap	—46	—25	7-12 in. Lap	—10	+ 6

Steel Wire

BASE PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.75c. to 5.00c.
Annealed soft	4.75c. to 5.00c.
Galvanized annealed	5.40c. to 5.65c.
Coppered basic	5.40c. to 5.65c.
Tinned soft Bessemer	6.40c. to 6.65c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	20 c. to 21 c.
High brass wire	20½c. to 21½c.
Brass rods	17¼c. to 18¼c.
Brass tube, brazed	27 c. to 28 c.
Brass tube, seamless	23½c. to 24 c.
Copper tube, seamless	26½c. to 26¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 3c. per lb, advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	Primes	Wasters
			80 lb.	$5.80 $5.55
			90 lb.	5.90 5.65
			100 lb.	6.00 5.75
IC	$10.00	$8.50	IC	6.15 5.90
IX	11.50	10.00	IX	7.15 6.90
IXX	13.00	11.25	IXX	8.15 7.90
IXXX	14.25	12.50	IXXX	9.15 8.90
IXXXX	16.00	14.00	IXXXX	10.15 9.90

Terne Plates

8-lb. coating, 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	9.00

Tin

Straits pig	42c.
Bar	47c. to 52c.

Copper

Lake ingot	16 c.
Electrolytic	15¾c.
Casting	15½c.

Spelter and Sheet Zinc

Western spelter	8¾c.
Sheet zinc, No. 9 base, casks	10¼c. open 10¾c.

Lead and Solders*

American pig lead	8¼c. to 9c.
Bar lead	9c. to 10c.
Solder, ½ and ½ guaranteed	29c.
No. 1 solder	27½c.
Refined solder	24½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	75c.
Commercial grade, per lb	35c.
Grade D, per lb	25c.

Antimony

Asiatic	7½c. to 8¼c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	26c. to 28c.

Old Metals

Business is quiet but values continue firm. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.50
Copper, heavy wire	12.00
Copper, light and bottoms	10.00
Brass, heavy	7.25
Brass, light	6.00
Heavy machine composition	9.50
No. 1 yellow brass turnings	7.25
No. 1 red brass or composition turnings	8.75
Lead, heavy	6.00
Lead, tea	4.50
Zinc	4.50